

REPORT NUMBER 216-GTL-03-004

**SAFETY COMPLIANCE TESTING FOR  
FMVSS NO. 216  
ROOF CRUSH RESISTANCE**

**GENERAL MOTORS CORPORATION  
2003 CHEVROLET TRAILBLAZER, MPV  
NHTSA NO. C30107**

**GENERAL TESTING LABORATORIES, INC.  
1623 LEEDSTOWN ROAD  
COLONIAL BEACH, VIRGINIA 22443**



**AUGUST 19, 2003**

**FINAL REPORT**

**PREPARED FOR**

**U. S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
SAFETY ENFORCEMENT  
OFFICE OF VEHICLE SAFETY COMPLIANCE  
400 SEVENTH STREET, SW  
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## SECTION 1

### PURPOSE OF COMPLIANCE TEST

#### 1.0 PURPOSE OF COMPLIANCE TEST

A 2003 Chevrolet Trailblazer MPV was subjected to Federal Motor Vehicle Safety Standard (FMVSS) No. 216 testing to determine if the vehicle was in compliance with the requirements of the standard. The purpose of this standard is to reduce deaths and injuries due to the crushing of the roof into the occupant compartment in rollover crashes.

#### 1.1 The test vehicle was a 2003 Chevrolet Trailblazer MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 1GNDT13SX32213808

B. NHTSA No.: C30107

C. Manufacturer: GENERAL MOTORS CORPORATION

D. Manufacture Date: 11/02

#### 1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 216 testing on July 28, 2003.

## SECTION 2

### COMPLIANCE TEST RESULTS SUMMARY

#### 2.0 TEST RESULTS

All tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Procedure, TP-216-05 and General Testing Laboratories Procedure, TP-216-05B with the following modifications requested by the COTR:

- 1) The vehicle was rigidly mounted in the test fixture by welding vertical supports to the vehicle jack points to prevent any vehicle movement. Chains were not used in an effort to reduce and/or eliminate "pre-stressing" of the vehicle due to the tightening of chains.
- 2) Dial gauges were placed at the vehicle corners and at the passenger door to track overall vehicle motion and the ability of the alternate tie-down procedure to restrict motion of the vehicle.
- 3) String potentiometers were placed at the driver's designated seat position and attached to the interior surface of the roof above a normally positioned 50<sup>th</sup> percentile Hybrid III ATD head. The string potentiometers tracked the interior motion of the roof.
- 4) Performed the roof crush test to a loading ram displacement of 127 mm or 44,482 N force, whichever comes first.

The data for this portion of the test can be found on Data Sheets 6 and 7.

Based on the test performed, the 2003 Chevrolet Trailblazer appears to meet the requirements of FMVSS 216 testing.

## SECTION 3

## COMPLIANCE TEST DATA

3.0 TEST RESULTS

The following data sheets document the results of testing on the 2003 Chevrolet Trailblazer.

DATA SHEET 1  
FMVSS 216  
SUMMARY OF RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2003 CHEVROLET TRAILBLAZER MPV

VEH. NHTSA NO: C30107; VIN: 1GNDT13SX32213808

VEH. BUILD DATE: 11/02; TEST DATE: JULY 28, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

A. VISUAL INSPECTION OF TEST VEHICLE

Upon receipt, inspect vehicle for completeness, function, and discrepancies or damage which might influence the testing.

RESULTS:

B. VEHICLE DATA

- (1) Vehicle type as shown on certification label: MPV  
 (2) Vehicle UVW as recorded on Data Table 2: 2018.6 kg

C. STATIC LOAD TEST OF DRIVER SIDE OF ROOF

Minimum roof crush resistance required by FMVSS 216 for the vehicle tested:

MCCR as recorded on Data Table 2: 29,673 N

Maximum roof crush resistance measured during test was  
42,808 N at 72.4 mm

PASS FAIL

X         

D. POST TEST VISUAL INSPECTION

Flattened area on roof on driver's side from "A" pillar to "C" pillar approximately 1500 mm long x 650 mm wide. Windshield shattered, driver door glass shattered, driver's "A" pillar and "B" pillar are bent.

RESULTS:

REMARKS:

RECORDED BY: [Signature]  
 APPROVED BY: [Signature]

DATE: 07/28/03



DATA SHEET 2  
FMVSS 216  
RECEIVING INSPECTION

VEH. MOD YR/MAKE/MODEL/BODY: 2003 CHEVROLET TRAILBLAZER MPV

VEH. NHTSA NO: C30107; VIN: 1GNDT13SX32213808

VEH. BUILD DATE: 11/02; TEST DATE: JULY 28, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

Upon receipt, the vehicle will be examined visually for completeness, function, and damage. The roof and supporting structures such as the doors and windows should be checked for proper operation and any discrepancies which may influence the testing. The vehicle will be weighed and the minimum roof crush resistance determined.

RESULTS:

(1) Unloaded Vehicle Weight (UVW)

Left Front	<u>550.7</u>	kg	Left Rear	<u>470</u>	kg
Right Front	<u>517.5</u>	kg	Right Rear	<u>480.4</u>	kg
Front Axle	<u>1068.2</u>	kg	Rear Axle	<u>950.4</u>	kg

TOTAL UVW 2018.6 kg

(2) Vehicle type as shown on vehicle certification label: MPV

(3) Minimum Roof Crush Resistance (MCRR):

Passenger Car:

UVW x 1.5 x 9.8 = N/A N

MCRR = N/A N (UVW x 1.5 x 9.8 or 22,241 N whichever is less)

MPV, Truck or Bus:

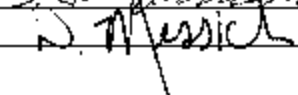
MCRR = UVW x 1.5 x 9.8 = 29,673 N

(4) Other Comments: \_\_\_\_\_

REMARKS:

RECORDED BY: 

DATE: 07/28/03

APPROVED BY: 

DATA SHEET 3  
FMVSS 216  
PRE-TEST PREPARATION

VEH. MOD YR/MAKE/MODEL/BODY: 2003 CHEVROLET TRAILBLAZER MPV

VEH. NHTSA NO: C30107; VIN: 1GNDT13SX32213808

VEH. BUILD DATE: 11/02; TEST DATE: JULY 28, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

Prior to testing, the following will be accomplished:

- A. Secure any convertible top, movable or removable roof structure in their weather tight positions Removed Roof Rack
- B. Close all windows OK
- C. Close and lock all doors OK
- D. State Side of Roof Tested Driver
- E. Measure the lateral angle of the test device at sufficient points to determine that it has a 25 degree (plus zero degree, minus one degree) angle 25°
- F. Measure the longitudinal angle of the loading device at sufficient points to determine that it has a 5 degree (plus zero minutes, minus 20 minutes) 5°
- G. The test device will initially contact the roof at 254 mm aft of windshield
- H. If the test device was relocated based on the requirements of Chapter 12.3 paragraph F, describe where the test device will initially contact the roof as relocated N/A
- I. Ambient temperature 51 mm from the vehicle roof in the immediate area of the test device: 27.2 degrees C.

REMARKS:

RECORDED BY: 

APPROVED BY: 

DATE: 07/28/03

DATA SHEET 4  
FMVSS 216

VEH. MOD YR/MAKE/MODEL/BODY: 2003 CHEVROLET TRAILBLAZER MPV

VEH. NHTSA NO: C30107; VIN: 1GNDT13SX32213808

VEH. BUILD DATE: 11/02; TEST DATE: JULY 28, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

RESULTS: Plots of load versus displacement and time versus displacement showed that:

- (1) The maximum roof crush resistance was 42,808 N at 72.4 mm
- (2) The rate of loading was 5.08 mm/sec (.2 in/sec)
- (3) The required roof crush resistance of 29,673 N was at 40.1 mm

REMARKS:

RECORDED BY: 

DATE: 07/28/03

APPROVED BY: 

DATA SHEET 5  
FMVSS 216  
POST TEST VISUAL INSPECTION

VEH. MOD YR/MAKE/MODEL/BODY: 2003 CHEVROLET TRAILBLAZER MPV

VEH. NHTSA NO: C30107; VIN: 1GNDT13SX32213808

VEH. BUILD DATE:11/02 : TEST DATE: JULY 28, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

Upon completion of testing, a detailed visual inspection of the vehicle shall be made. Describe all damage and deformation that occurred during the test.

**RESULTS:** Flattened area on roof on driver's side from "A" pillar to "C" pillar approximately 1500 mm long x 650 mm wide. Windshield shattered, driver door glass shattered, driver's "A" pillar and "B" pillar are bent.

RECORDED BY:

APPROVED BY:

DATE: 07/28/03

DATA SHEET 6  
FMVSS 216 MODIFIED PORTION PRE-TEST

VEH. MOD YR/MAKE/MODEL/BODY: 2003 CHEVROLET TRAILBLAZER MPV  
VEH. NHTSA NO: C30107; VIN: 1GNDT13SX32213808  
VEH. BUILD DATE: 11/02; TEST DATE: JULY 28, 2003  
TEST LABORATORY: GENERAL TESTING LABORATORIES  
OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

Driver Seat Torso Angle: 24°

Driver Seat "H" Point Location at Mid Travel:

X= 260 mm aft from centerline of front outboard seat mounting bolt  
Y= 203 mm inboard from centerline of front outboard seat mounting bolt  
Z= 310 mm up from centerline of front outboard seat mounting bolt

Point VRL (Vertical Measurement from H-Point to Headliner): 904.2 mm  
Point VRI (Vertical Measurement from H-Point to Structure Above Headliner): 924.6 mm  
Point RE (Distance from H-Point to a point 112mm behind point VRI): 942.3 mm

#1 LVDT (R.F.) Length: 930 mm  
#2 LVDT (R.R.) Length: 907 mm  
#3 LVDT (L.R.) Length: 907 mm

Distance from LVDT #1 (R.F.) to LVDT #2 (R.R.) = 270 mm  
Distance from LVDT #2 (R.R.) to LVDT #3 (L.R.) = 250 mm  
Distance from LVDT #1 (R.F.) to LVDT #3 (L.R.) = 370 mm

All LVDT's are located on a 185 mm radius from a vertical line passing through the seat "H" point. Using the forward direction as 0° reference and measuring clockwise, LVDT #1 is located at 43°, LVDT #2 is located at 137° and LVDT #3 is located at 222°.

NOTES:

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RECORDED BY:   
APPROVED BY: 

DATE: 07/28/03

DATA SHEET 7  
FMVSS 216 MODIFIED PORTION POST TEST

VEH. MOD YR/MAKE/MODEL/BODY: 2003 CHEVROLET TRAILBLAZER MPV

VEH. NHTSA NO: C30107: VIN: 1GNDT13SX32213808

VEH. BUILD DATE: 11/02 TEST DATE: JULY 28, 2003

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

Maximum Load Applied =  $\frac{42,808}{142.2}$  N @  $\frac{72.4}{33.142}$  mm

#1 LVDT (RF) Displacement = 56.8 mm

#2 LVDT (RR) Displacement = 63.9 mm

#2 LVDT (LR) Displacement =	50.2 mm
#3 LVDT (LR) Displacement =	47.2 mm

Left Front Dial Indicator Displacement = 8.9 mm

Right Front Dial Indicator Displacement = 3.1 mm

Left Rear Dial Indicator Displacement =	22.5 mm
---	---------

Right Rear Dial Indicator Displacement =	19.3 mm
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Right Door Sill Dial Indicator Displacement = 0.0 mm

NOTES:

RECORDED BY:

APPROVED BY:

DATE: 07/28/03

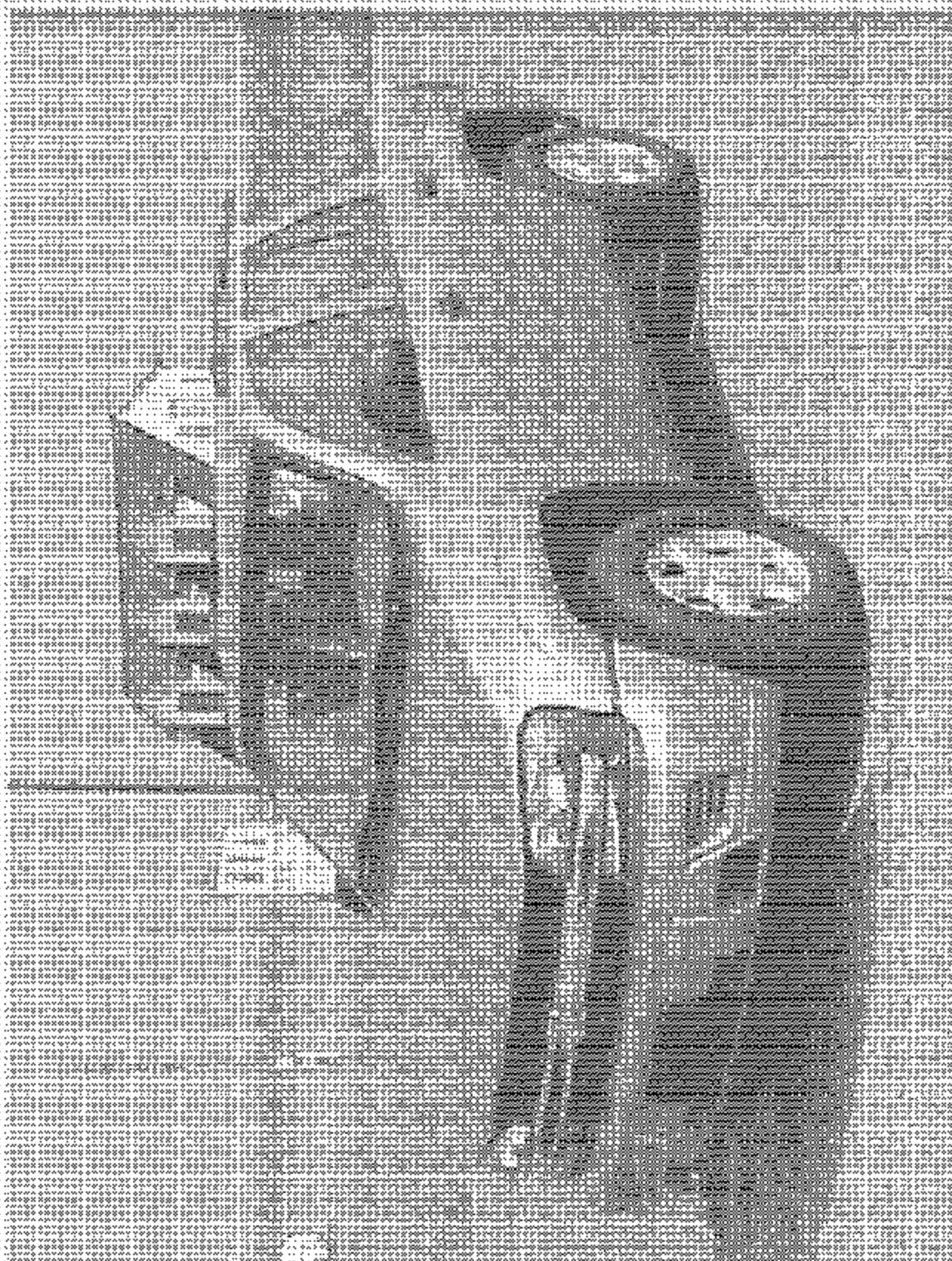
# SECTION 4 INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 - INSTRUMENTATION &amp; EQUIPMENT LIST

EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO.	CAL. DATE	NEXT CAL. DATE
COMPUTER	AT&T	486D66	BEFORE USE	BEFORE USE
TEST FIXTURE	GTL	N/A	N/A	N/A
A/D INTERFACE	METRABYTE	DAS-16(F)	BEFORE USE	BEFORE USE
SIGNAL CONDITIONER	METRABYTE	EXP-RES	BEFORE USE	BEFORE USE
LOAD CELL	REVERE	USP2/46024	06/03	06/04
DIAL INDICATOR	MITUTOYO	2424-10	BEFORE USE	BEFORE USE
LINEAR POTENTIOMETER	SERVO SYSTEMS	20/69	BEFORE USE	BEFORE USE
LINEAR POTENTIOMETER	SERVO SYSTEMS	20/70	BEFORE USE	BEFORE USE
LINEAR POTENTIOMETER	SERVO SYSTEMS	20/72	BEFORE USE	BEFORE USE
LINEAR POTENTIOMETER	ELECTRIC ASSOC. INC.	11A4A6	BEFORE USE	BEFORE USE

SECTION 5  
PHOTOGRAPHS





2006 CHEVROLET TRAILBLAZER

NHTSA NO. C09107

PLVSS NO. 219

FIGURE 6-1

3. FORWARD VIEW OF VEHICLE ON TESTED

SIDE BEFORE TESTING

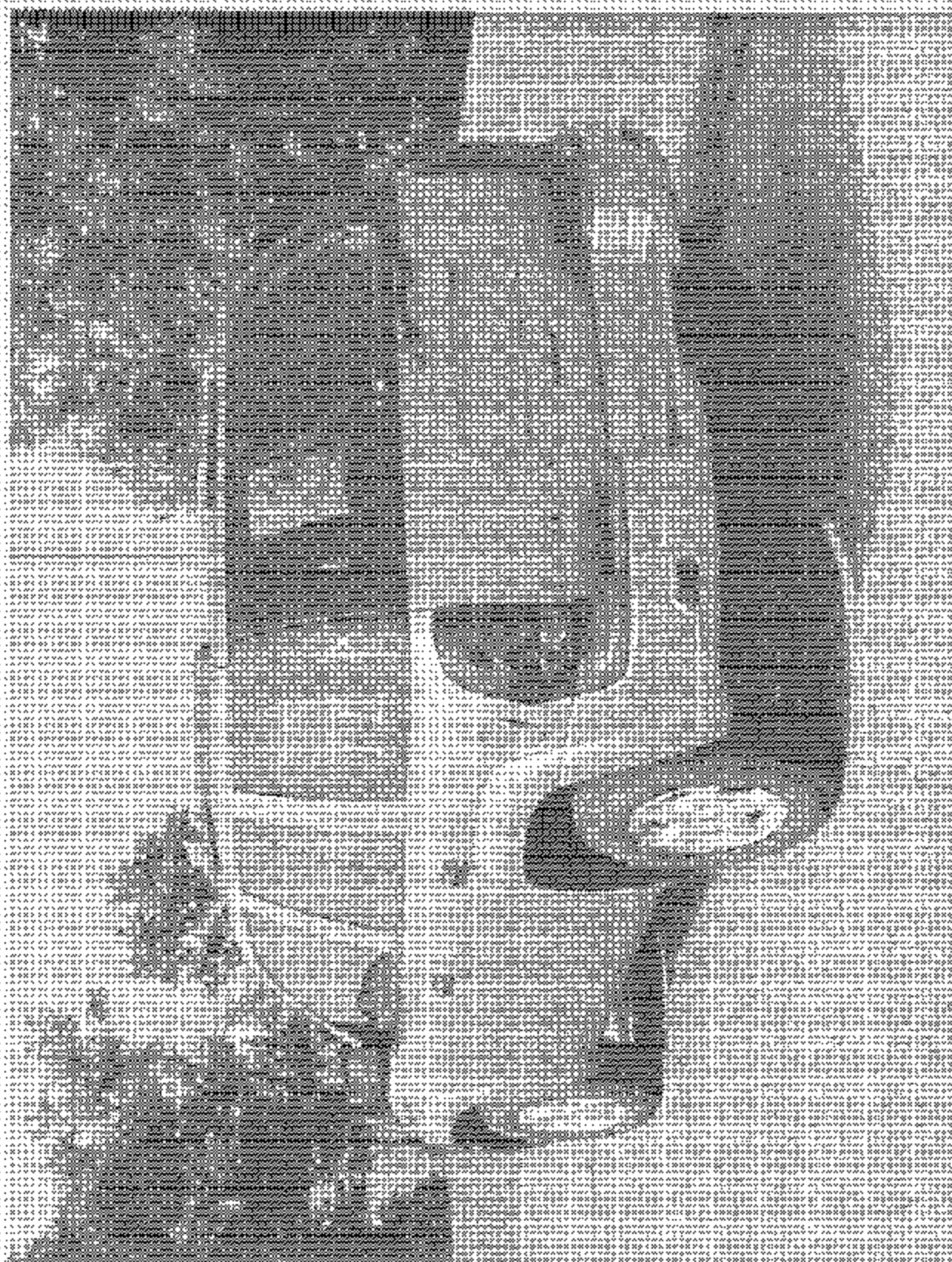
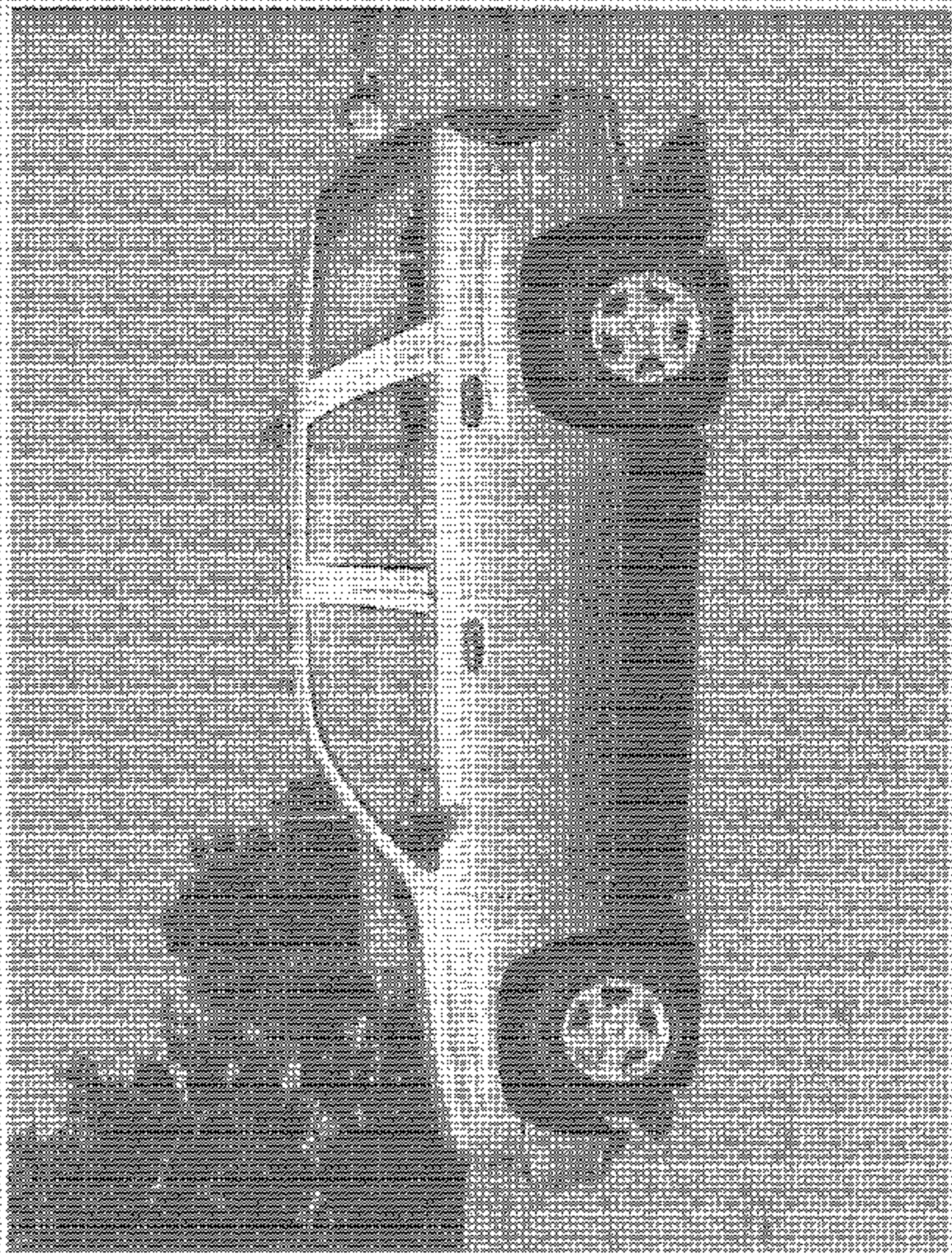


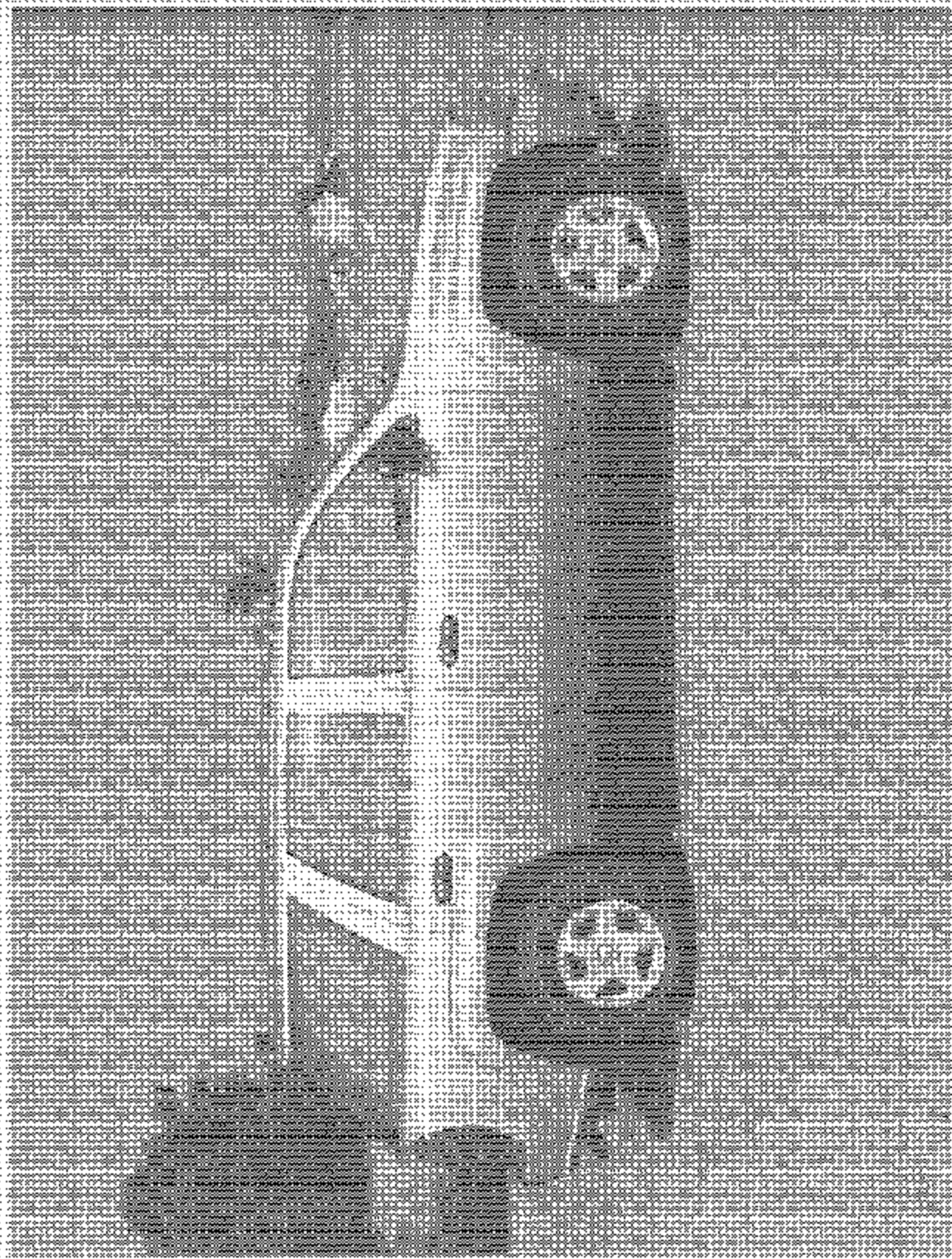
FIGURE 6.2  
REARWARD VIEW OF VEHICLE ON TESTED  
SIDE BEFORE TESTING

2003 CHEVROLET TRAILBLAZER  
NHTSA NO. 030107  
FMVSS NO. 216



2003 CHEVROLET MALIBU  
NHTSA NC C20102  
KAYS NC 216

FIGURE 52  
LEFT SIDE VIEW OF VEHICLE BEFORE  
TESTING



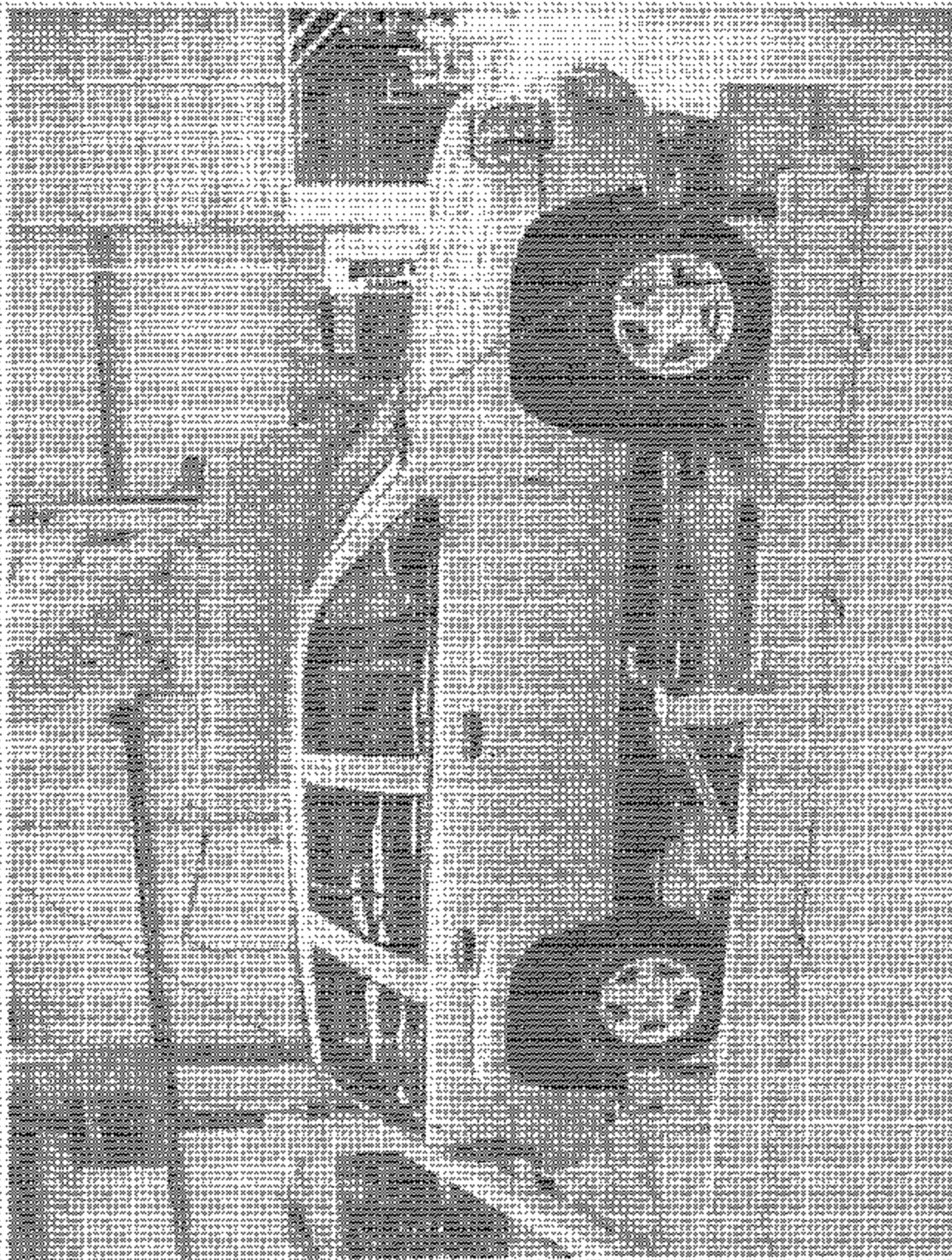
2006 CHEVROLET TRAIL BLAZER  
NHTSA NO. C20107  
PAVSS NO. 278

FIGURE B-4  
RIGHT SIDE VIEW OF VEHICLE BEFORE  
TESTING



2006 CHEVROLET TRAILBLAZER  
NHTSA NO. C00102  
FMVSS NO. 210

FIGURE 5-6  
FRONT VIEW OF TEST SET-UP PRE-TEST



2003 CHEVROLET TRAILBLAZER  
NHTSA NO. 030107  
FMVSS NO. 216

FIGURE 66  
VEHICLE IN TEST RIG

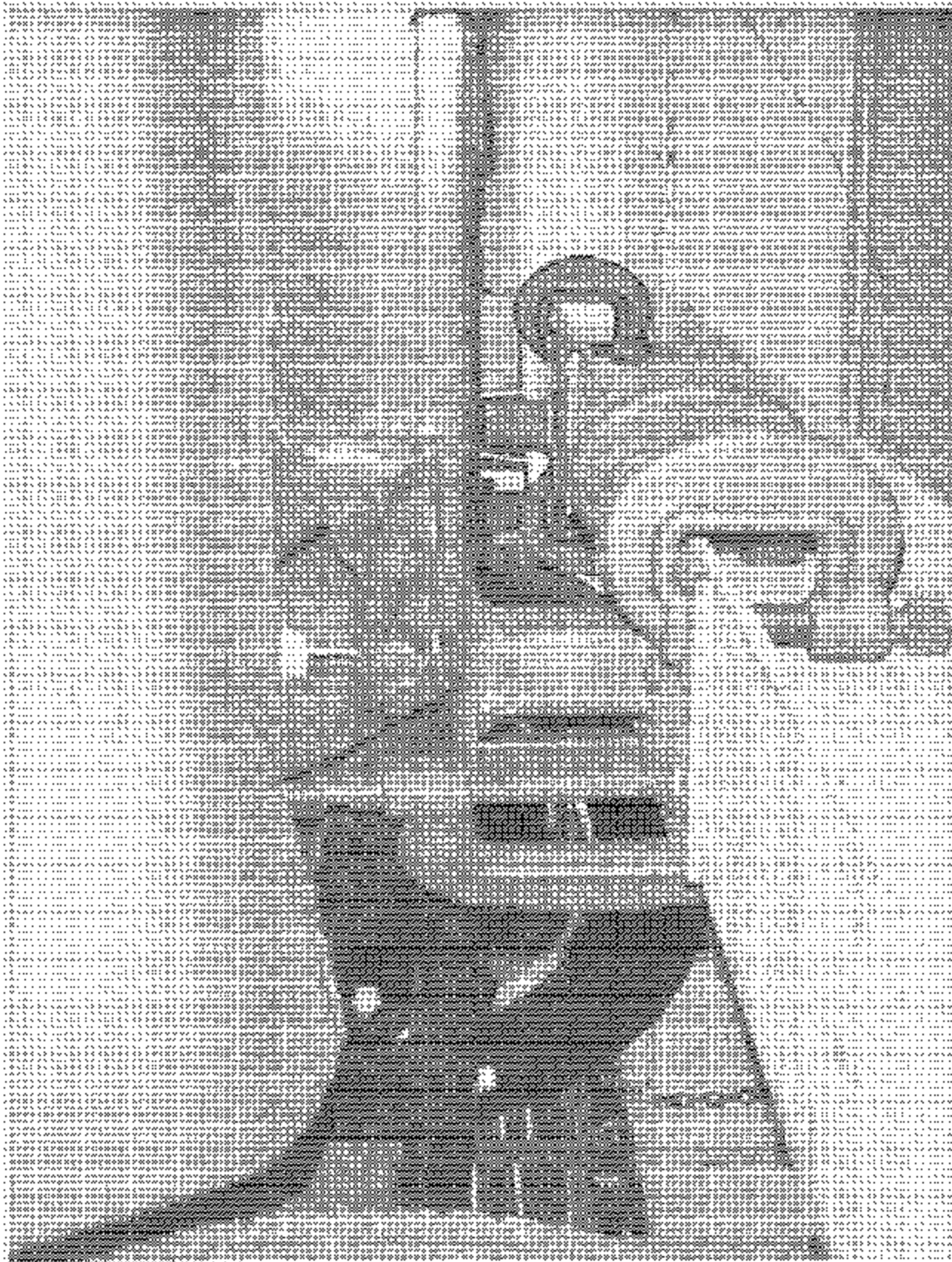
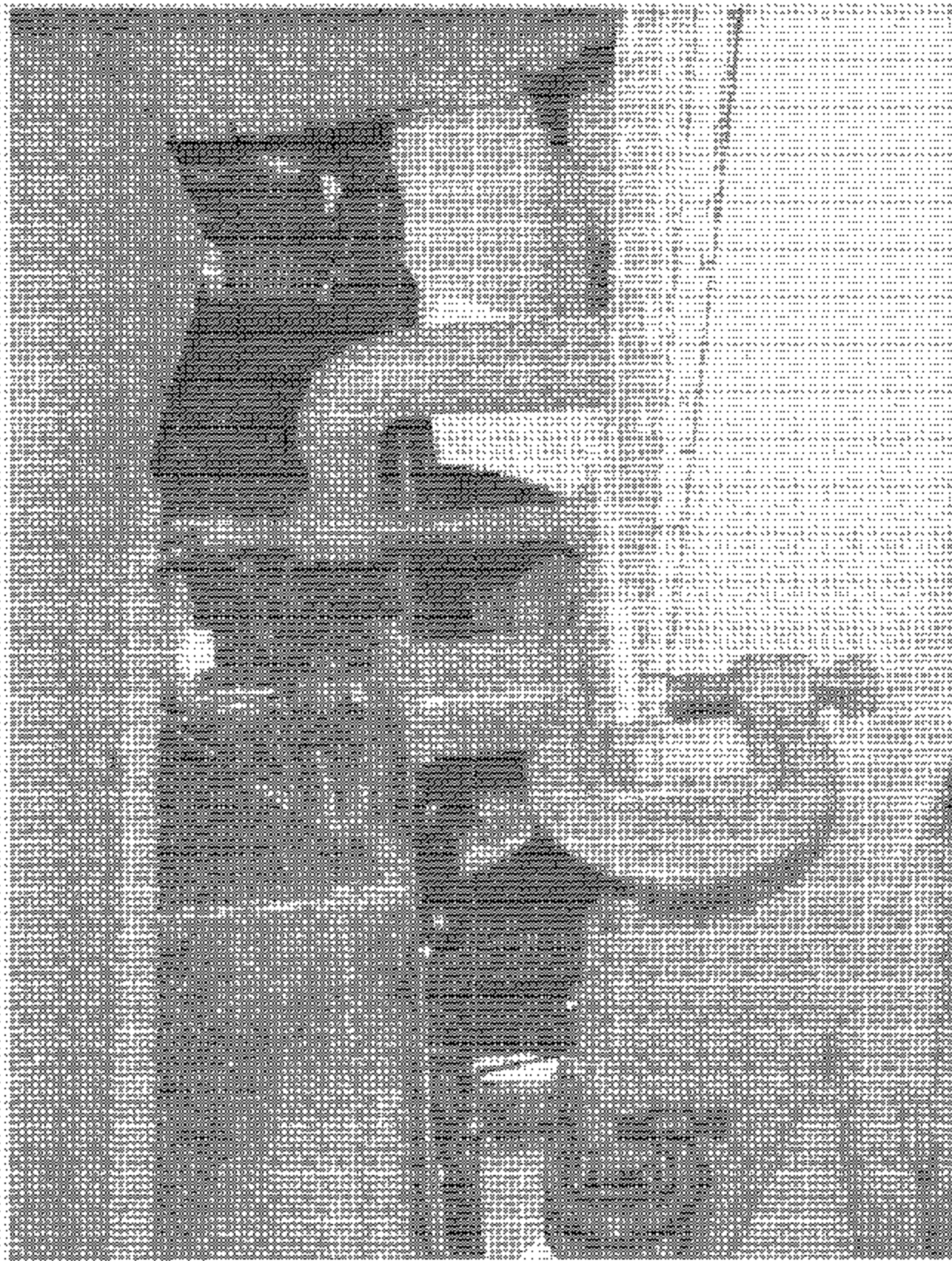


FIGURE 5.7  
LEFT FRONT VEHICLE MOUNTING

2000 CHEVROLET TRAILBLAZER  
NHTSA NO. C200107  
FMVSS NO. 216



2003 CHEVROLET TRAIL BLAZER  
NHTSA NO. CG9107  
FAVSS NO. 276

FIGURE 53  
RIGHT FRONT VEHICLE MOUNTING



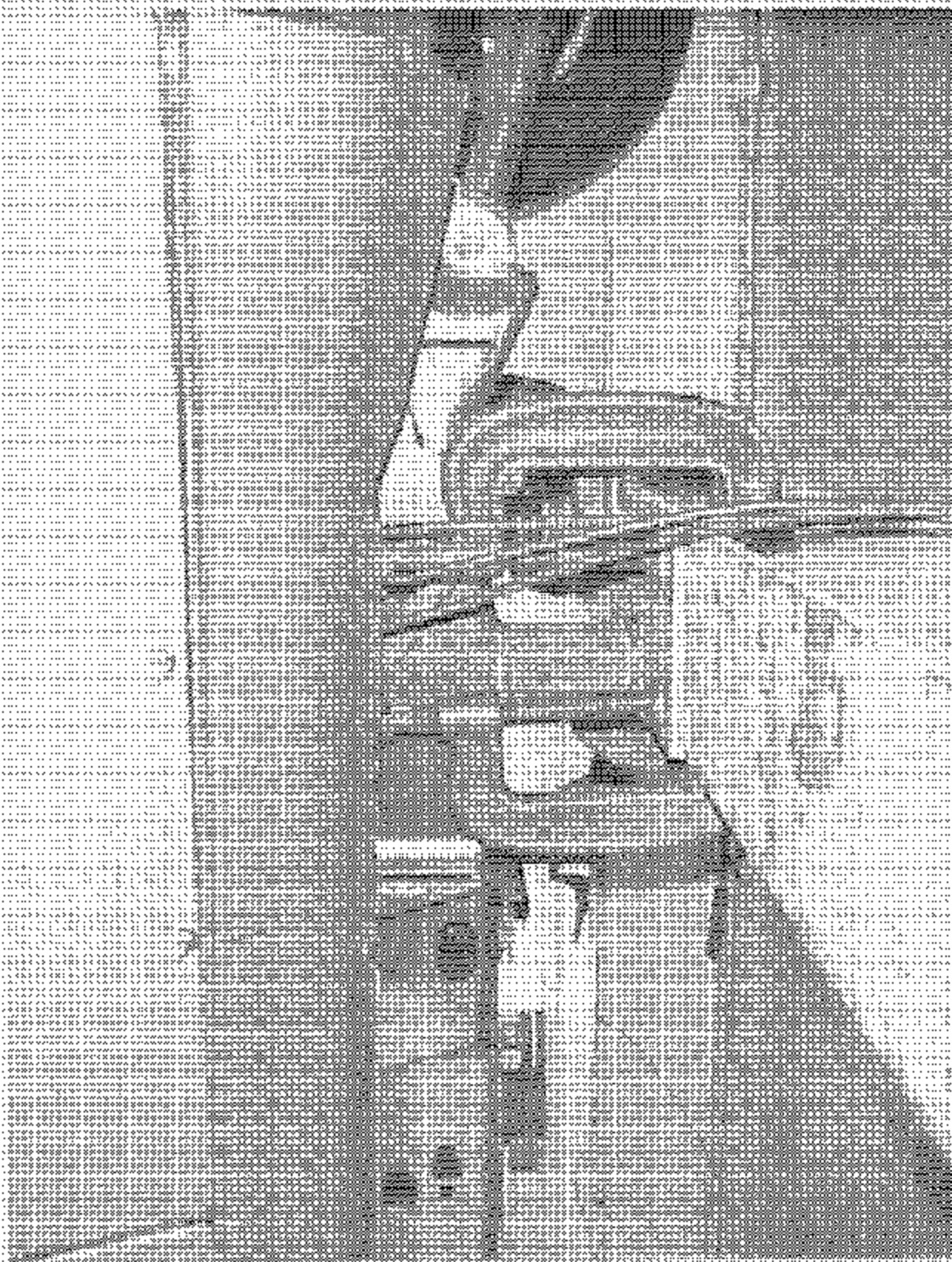
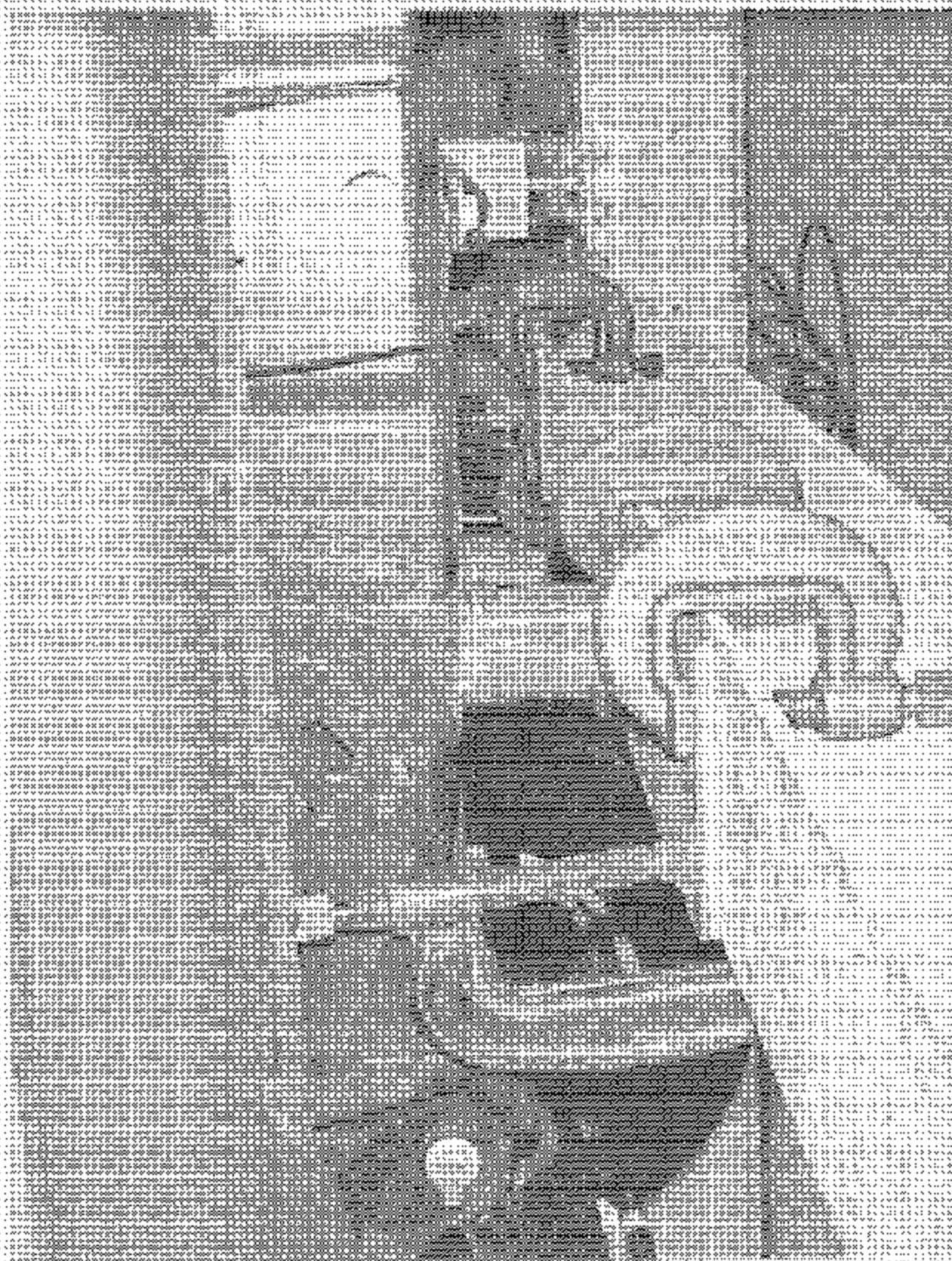


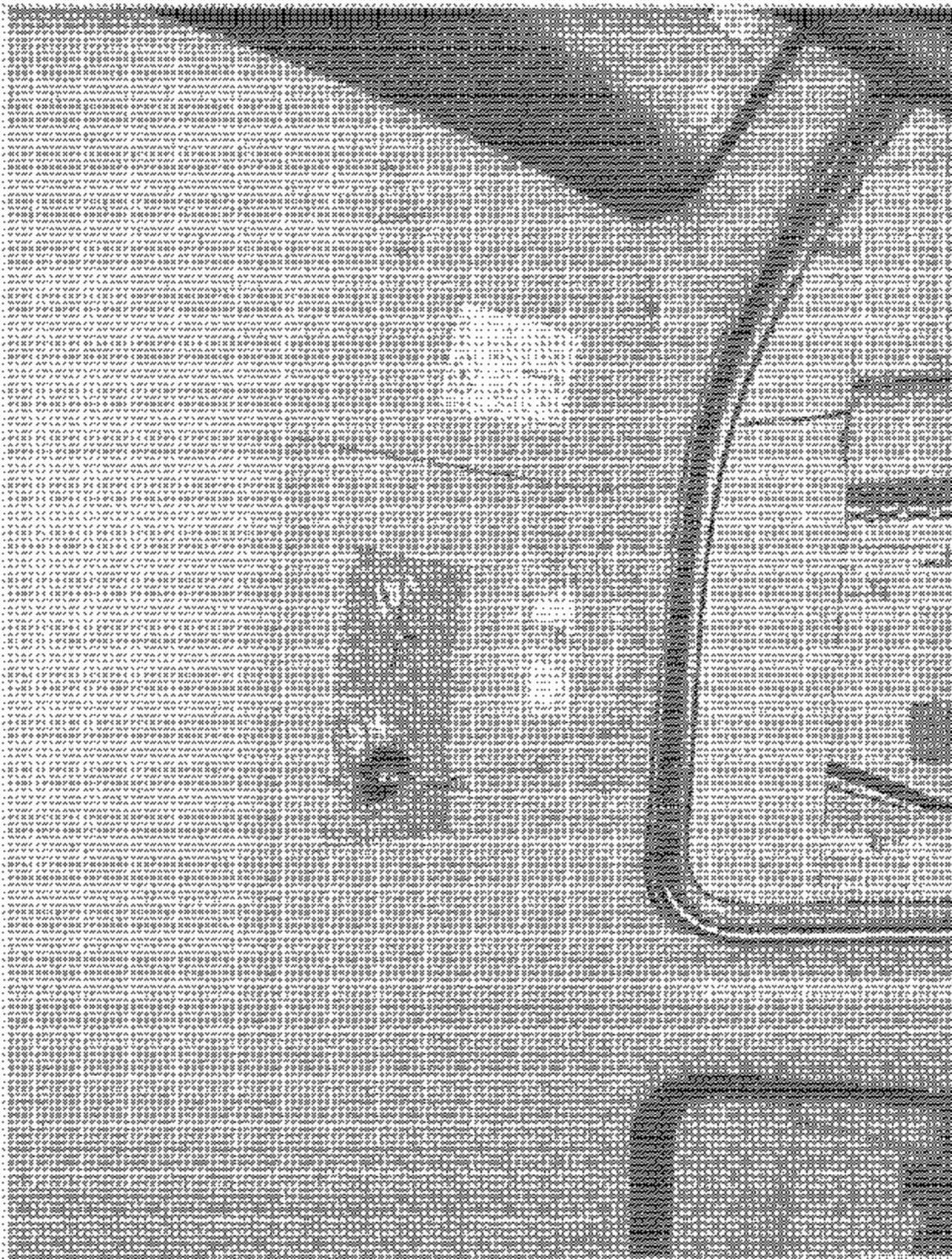
FIGURE 6-9  
LEFT REAR VEHICLE MOUNTING

2003 CHEVROLET TRAILBLAZER  
NHTSA NO. C30167  
FMVSS NO. 215



2003 CHEVROLET TRAIL BLAZER  
NHISA NO. C30167  
ENV55 NO. 215

FIGURE 6-10  
RIGHT REAR VEHICLE MOUNTING



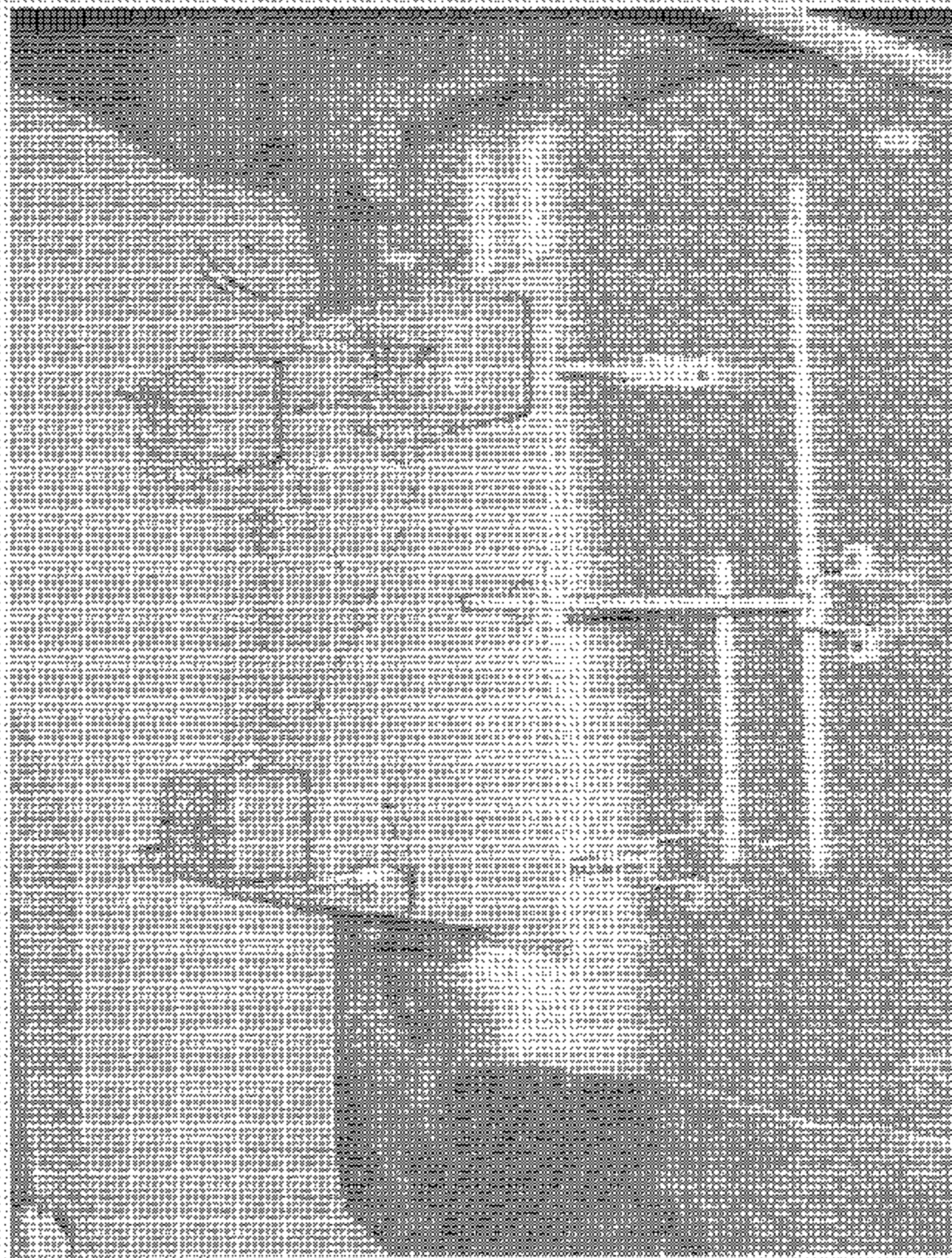
2000 CHEVROLET TRAILBLAZER

NHTSA NO. C80107

FMVSS NO. 216

FIGURE 5.11

LYDT DISPLACEMENT MOUNTING TO ROOF



200301EVROLET TRAILBLAZER  
NHISA NO. C30107  
EMVSS NO. 216

FIGURE 3-12  
LVDT TRANSDUCER MOUNTING AT 45 DEGREE

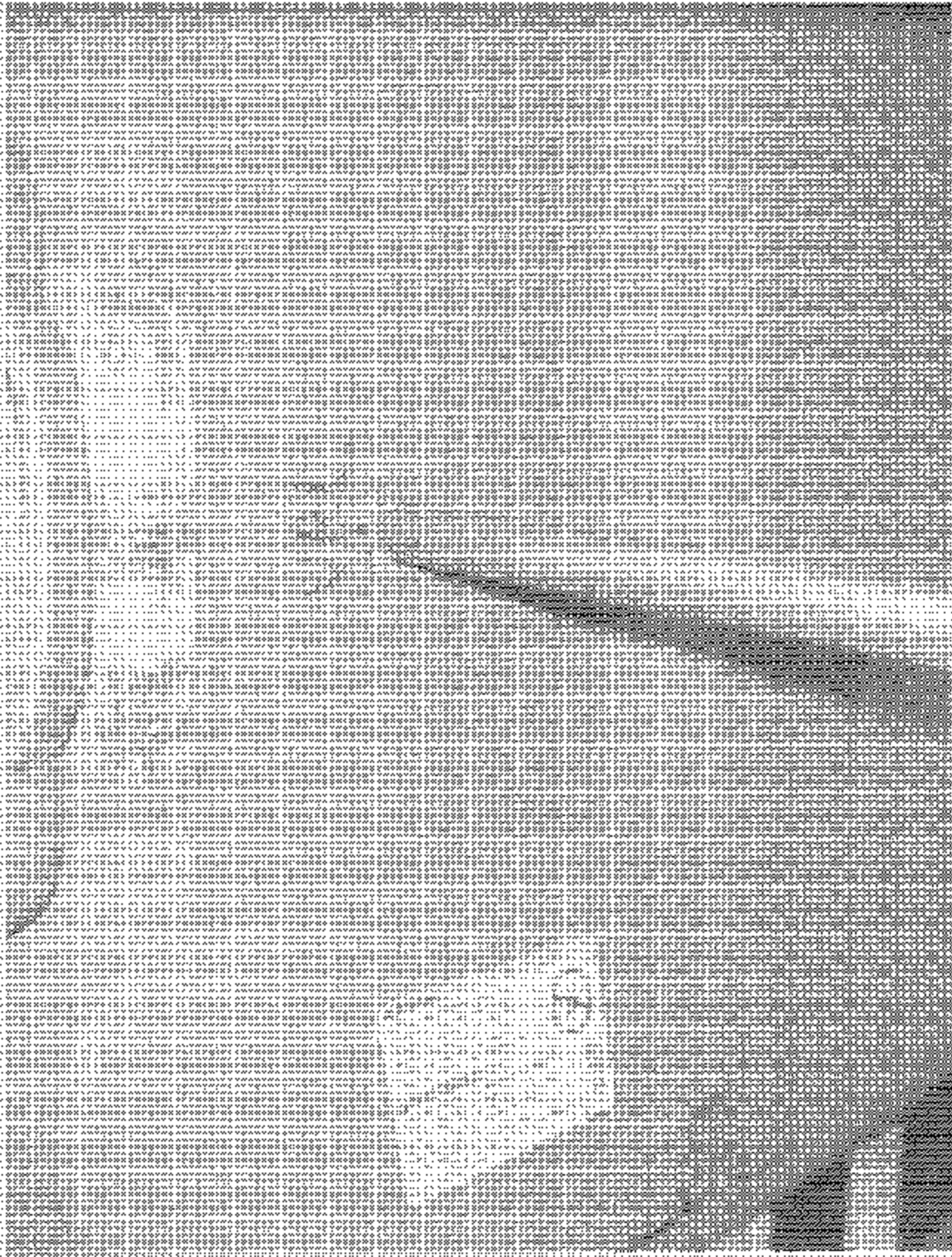


FIGURE 5.13  
VIEW SHOWING MEASUREMENT OF VRL

2003 CHEVROLET TRAIL BLAZER  
NHTSA NO. C02187  
FMVSS NO. 216

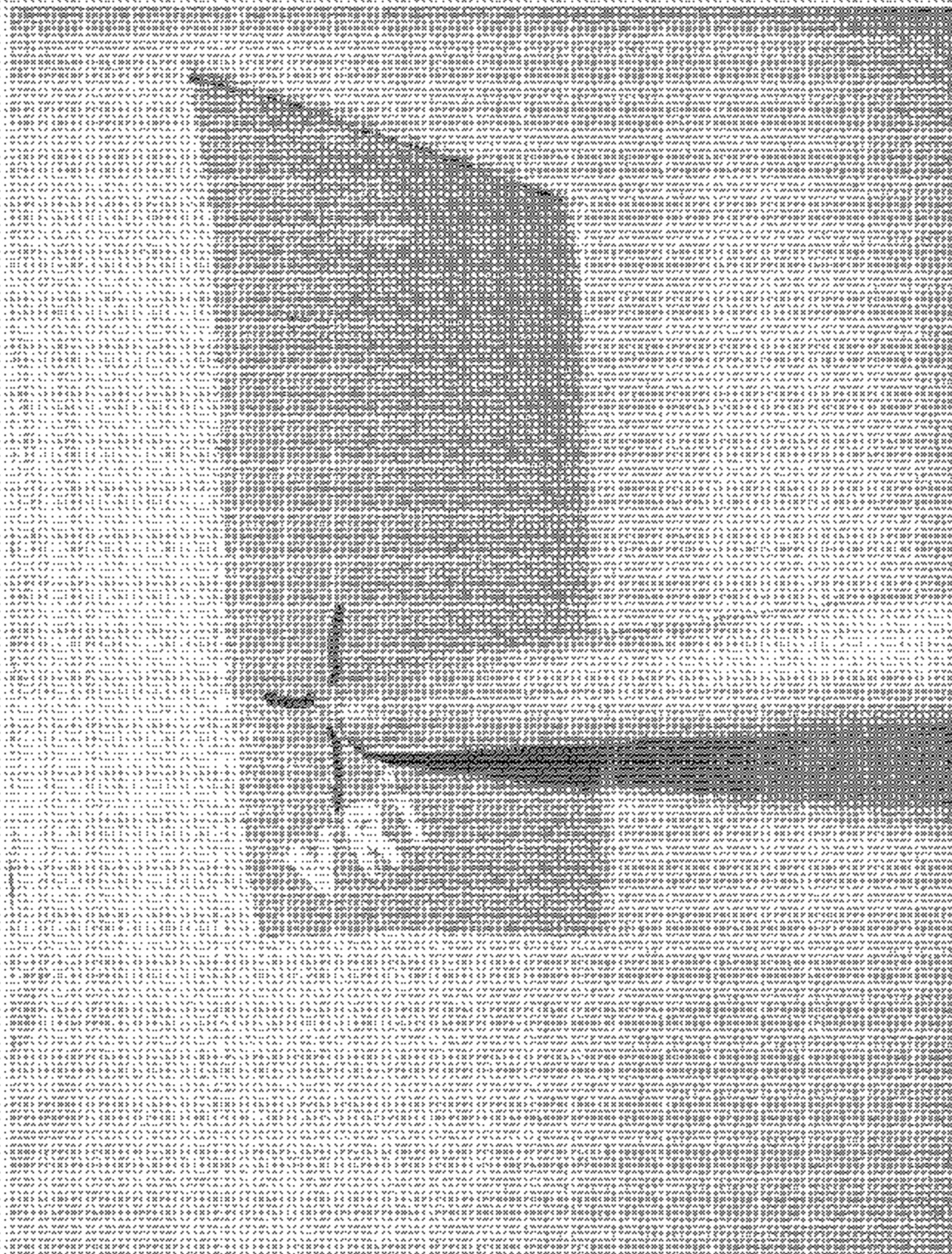


FIGURE S-14  
VIEW SHOWING MEASUREMENT OF VRI

2003 CHEVROLET TRAIL BLAZER  
NHTSA NO. C20107  
FLVSS NO. 216

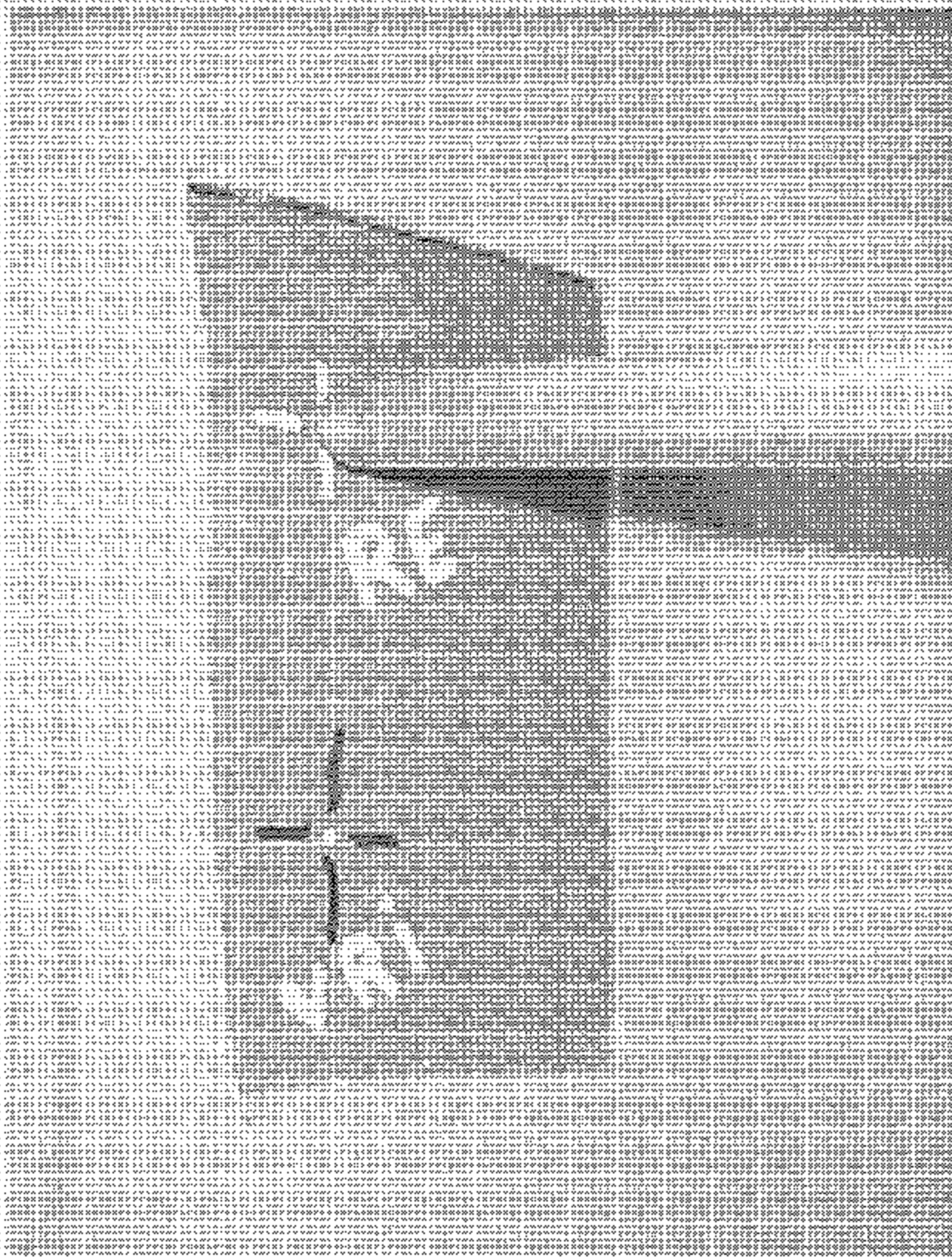
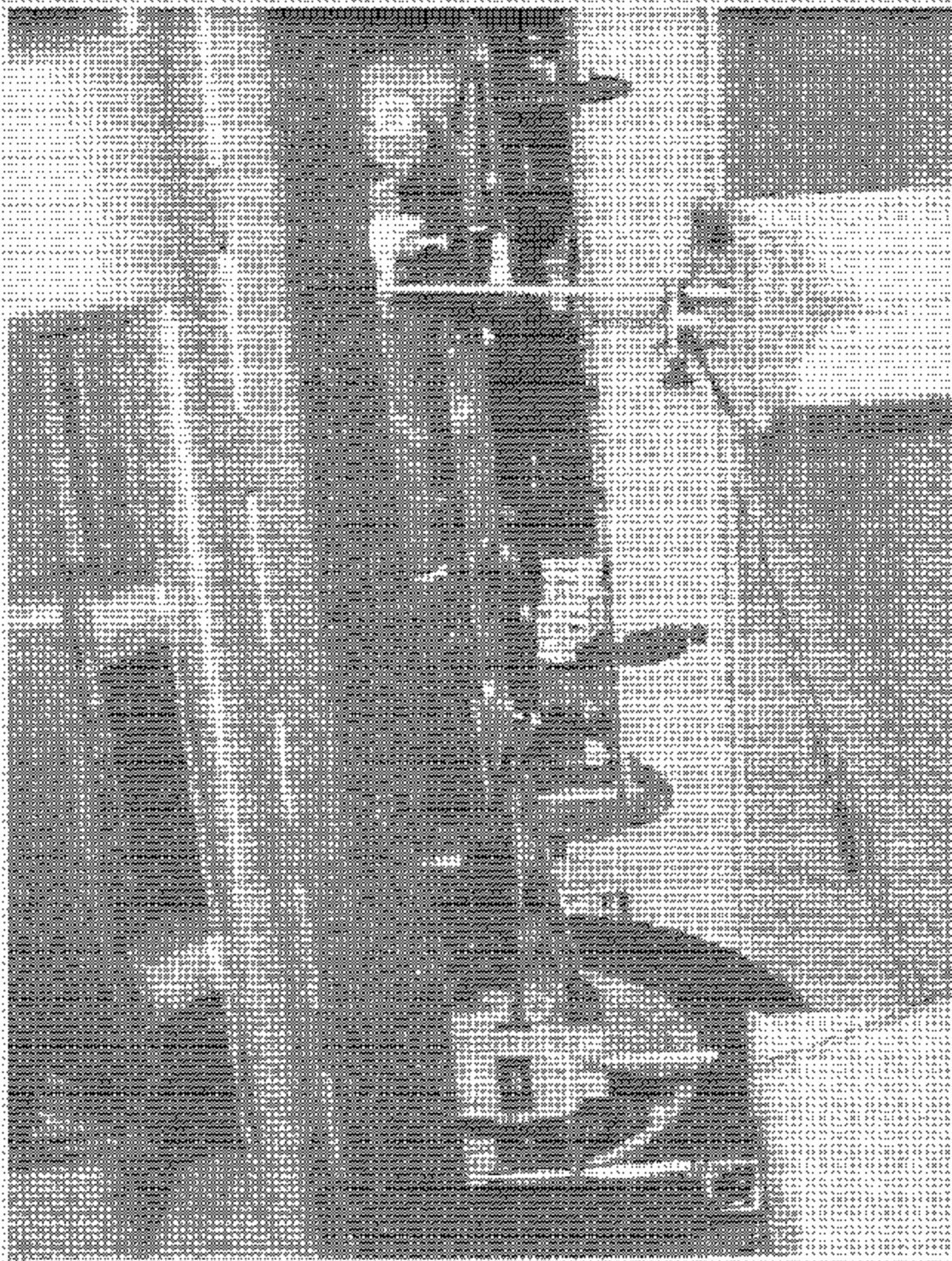


FIGURE 6-15  
VIEW SHOWING MEASUREMENT OF RE

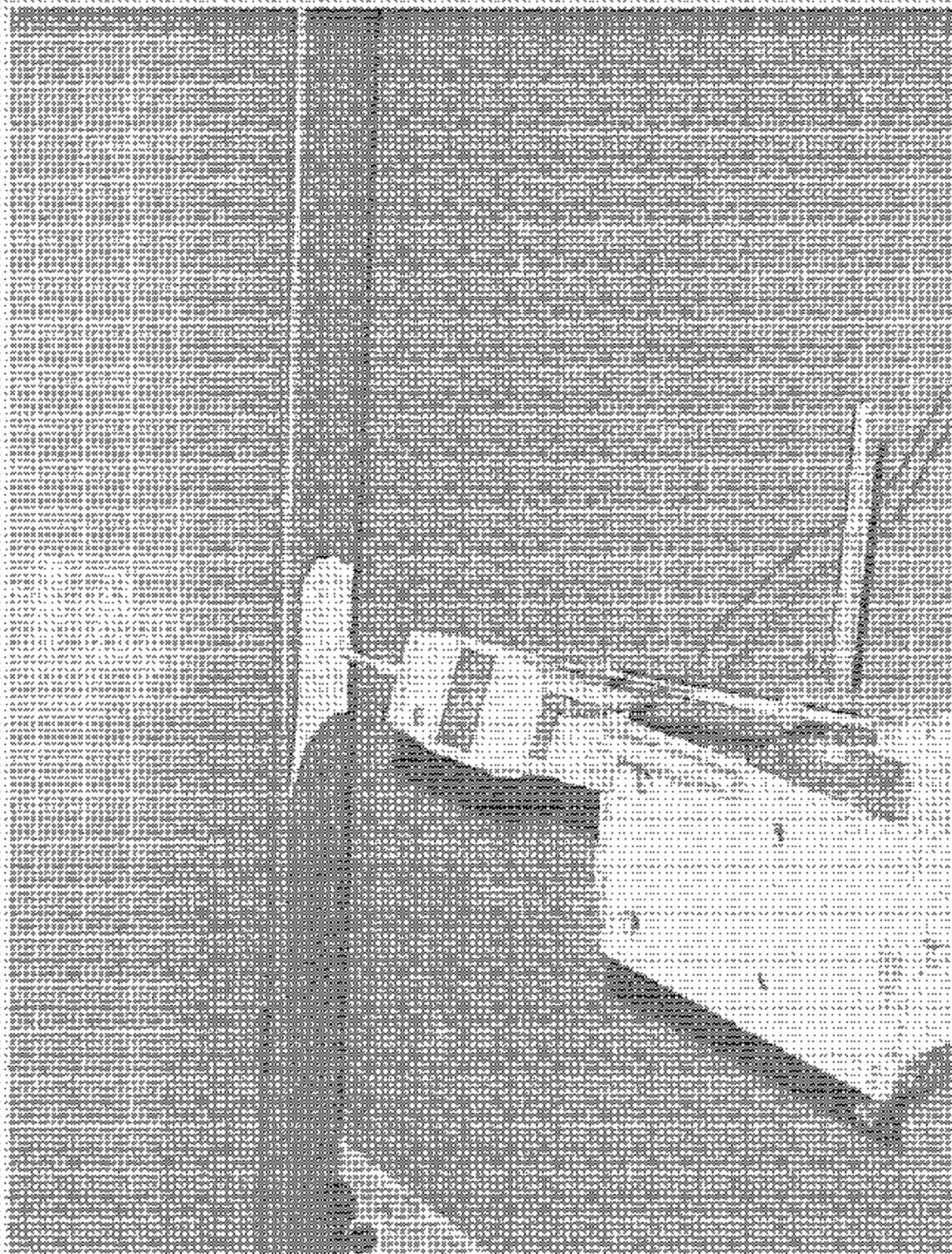
2006 CHEVROLET 1RA1BLA21H  
NHTSA NO. C09107  
FMVSS NO. 216



2003 CHEVROLET TRAIL BLAZER  
NHTSA NO. C32187  
FMVSS NO. 216

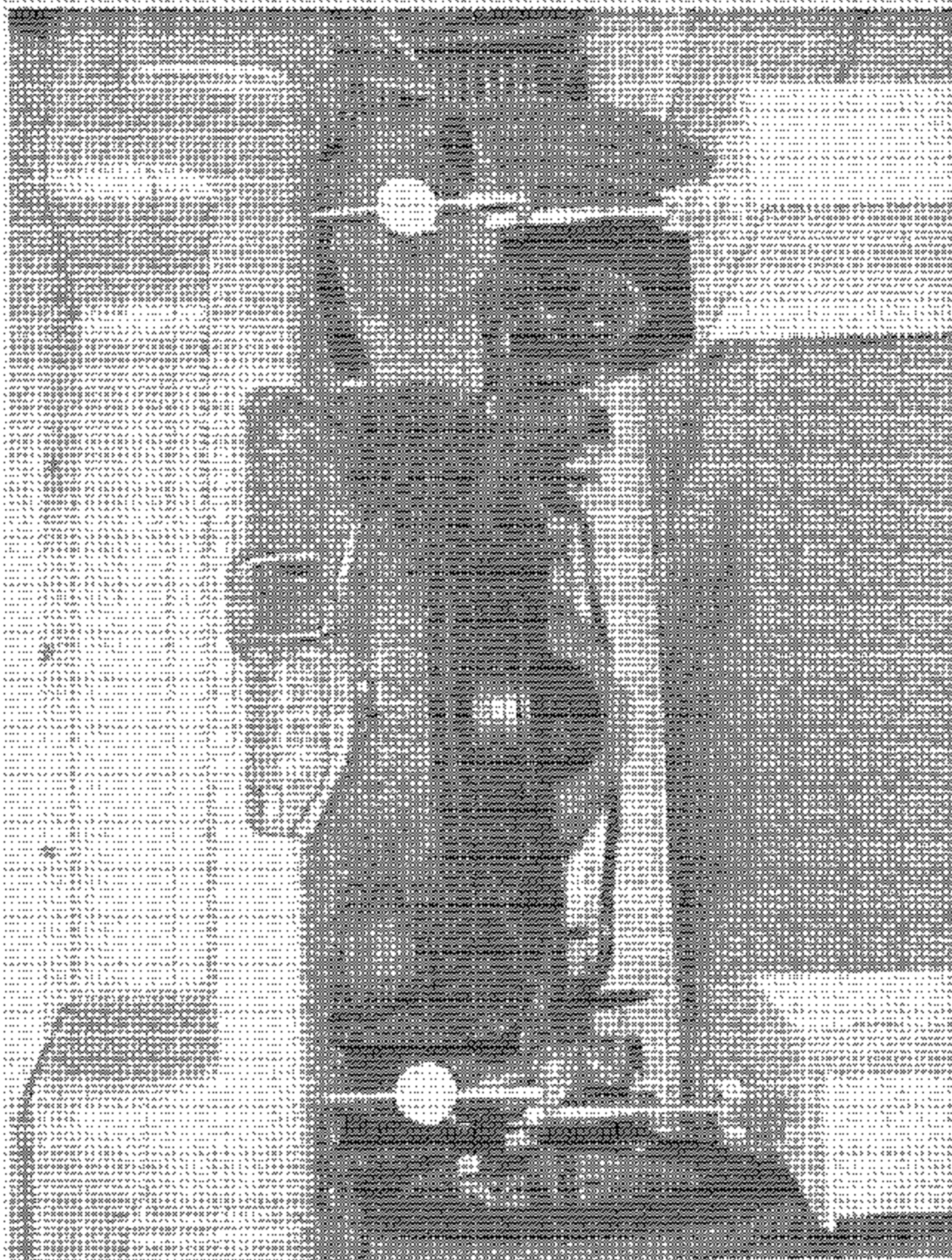
FIGURE 3-16  
DISPLACEMENT INDICATORS AT FRONT OF  
VEHICLE





2003 CHEVROLET TRAILBLAZER  
NHTSA NO. 030107  
PHVS NO. 216

FIGURE 6-17  
DISPLACEMENT INDICATORS AT PASSENGER  
DOOR SILL



2003 CHEVROLET TRAILBLAZER  
NHTSA NO. 039197  
FMVSS NO. 236

FIGURE 6-18  
DISPLACEMENT INDICATORS AT REAR OF  
VEHICLE



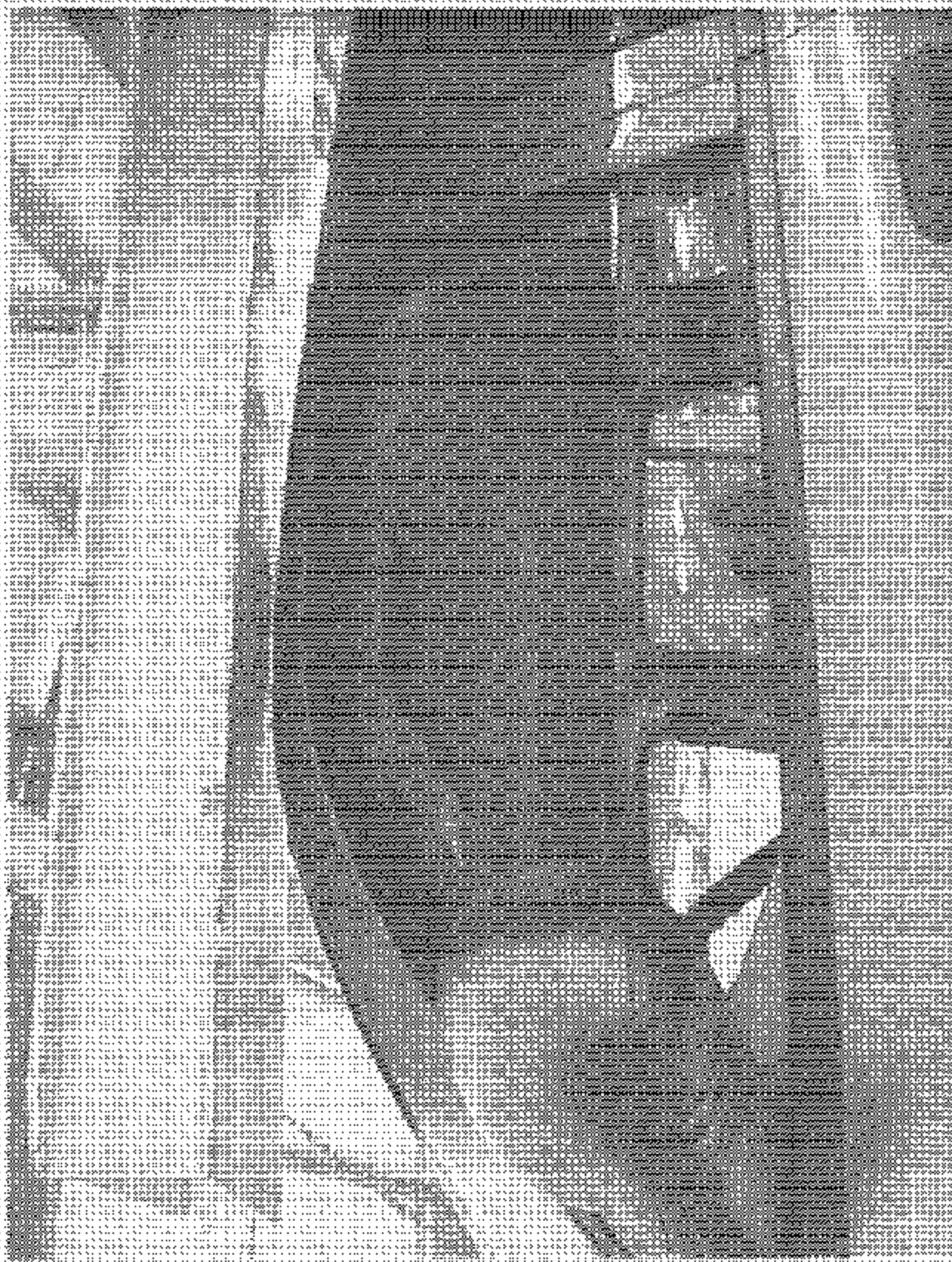
2003 CHEVROLET TRAILBLAZER  
UNITSA NO. C30107  
RMVSS NO. 210

FIGURE 3-16  
FRONT VIEW OF LOADING DEVICE PLACED  
AGAINST VEHICLE ROOF



2003 CHEVROLET TRAILBLAZER  
NHTSA NO. 020107  
FMVSS NO. 216

FIGURE S20  
REAR VIEW OF LOADING DEVICE PLACED  
AGAINST VEHICLE ROOF



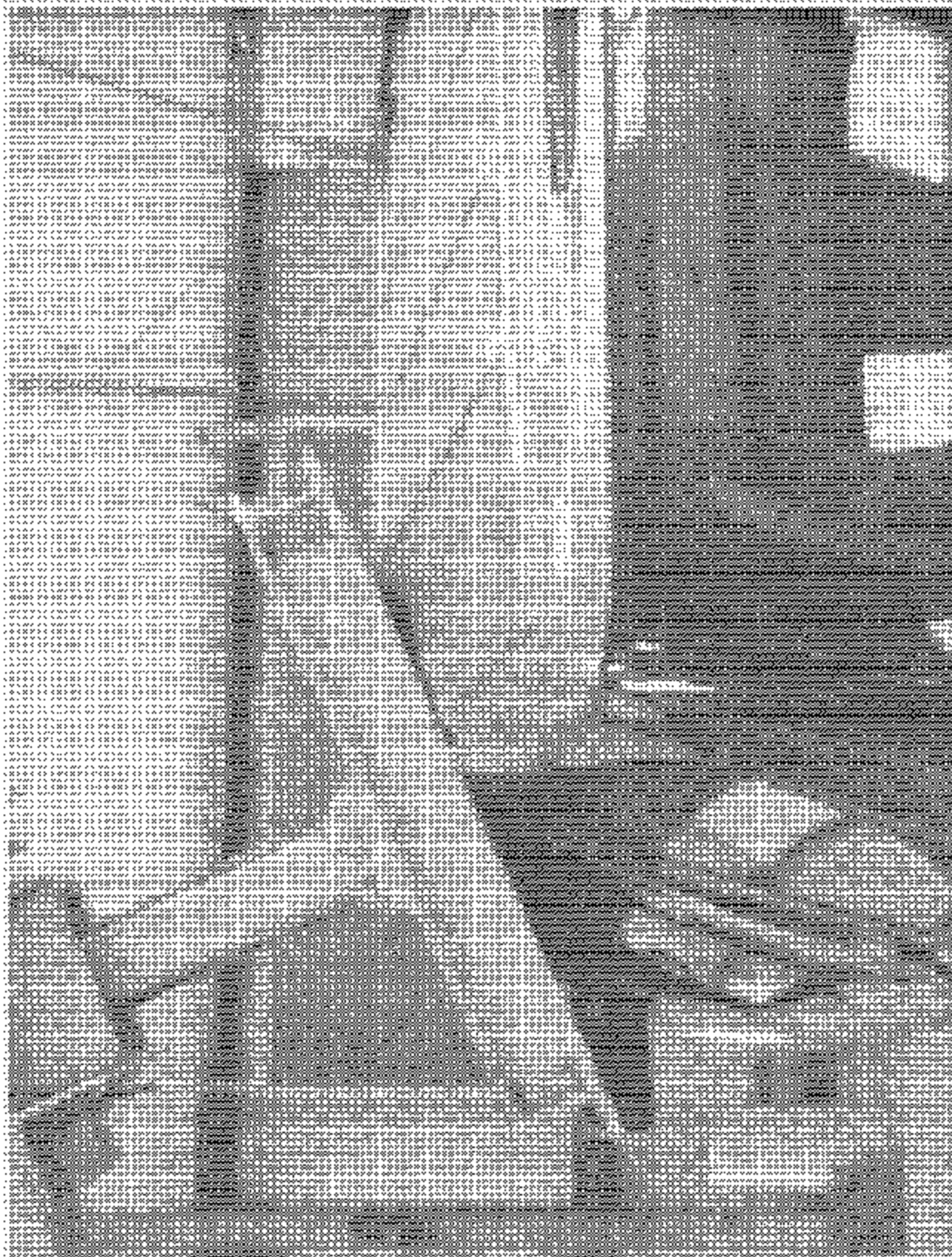
2003 CHEVROLET COBALT  
NHTSA NO. C00107  
RMVSS NO. 216

FIGURE 6.2  
SIDE VIEW OF LOADING DEVICE PLACED  
AGAINST VEHICLE ROOF



FIGURE 6.22  
FRONT VIEW OF LOADING DEVICE PLACED  
AGAINST VEHICLE ROOF AT FULL LOAD

FIGURE 6.23  
FRONT VIEW OF LOADING DEVICE PLACED  
AGAINST VEHICLE ROOF AT FULL LOAD



2003 CHEVROLET TRAILBLAZER  
NHTSA NO. D20107  
FMVSS NO. 216

FIGURE 3-23  
REAR VIEW OF LOADING DEVICE PLACED  
AGAINST VEHICLE ROOF AT FULL LOAD

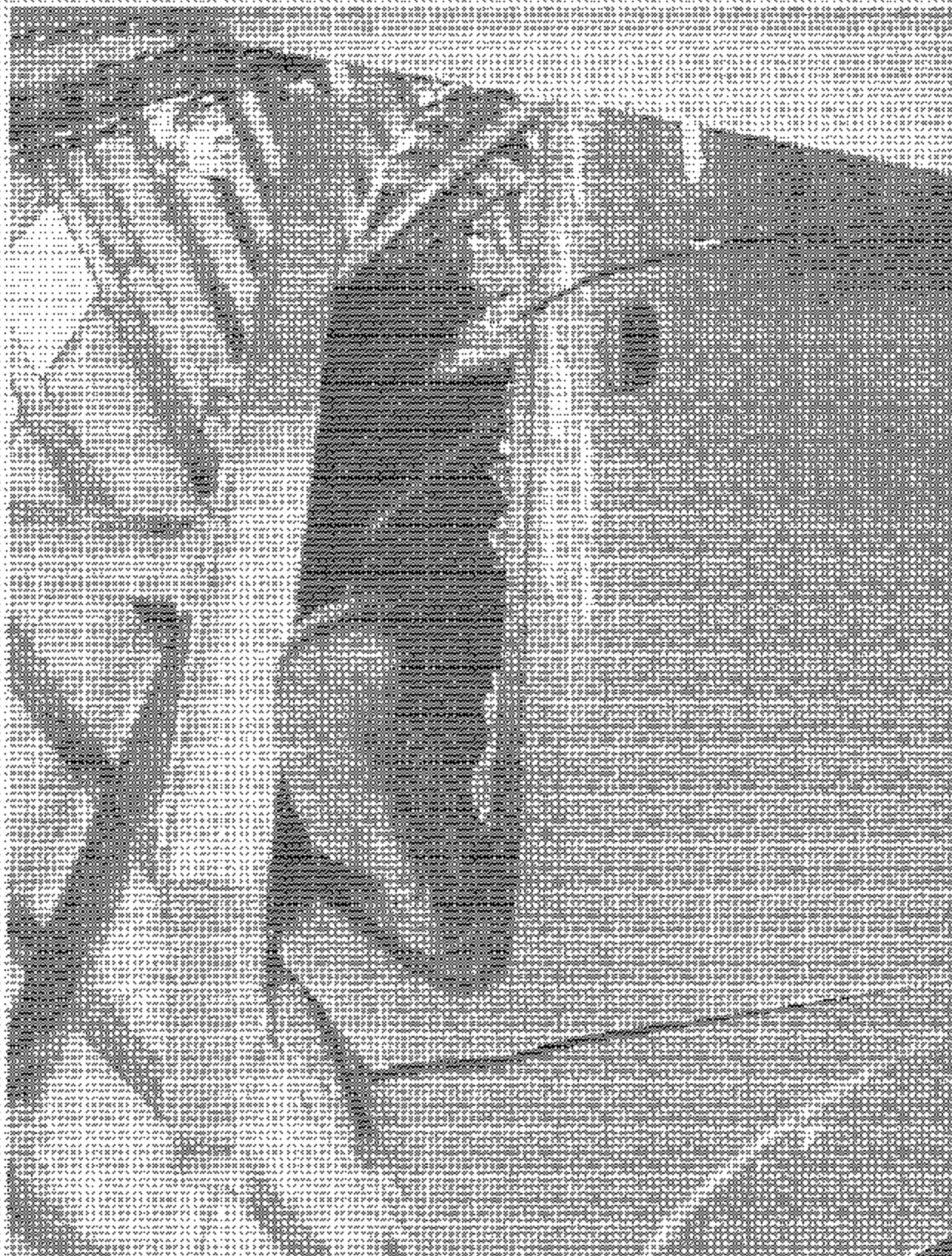
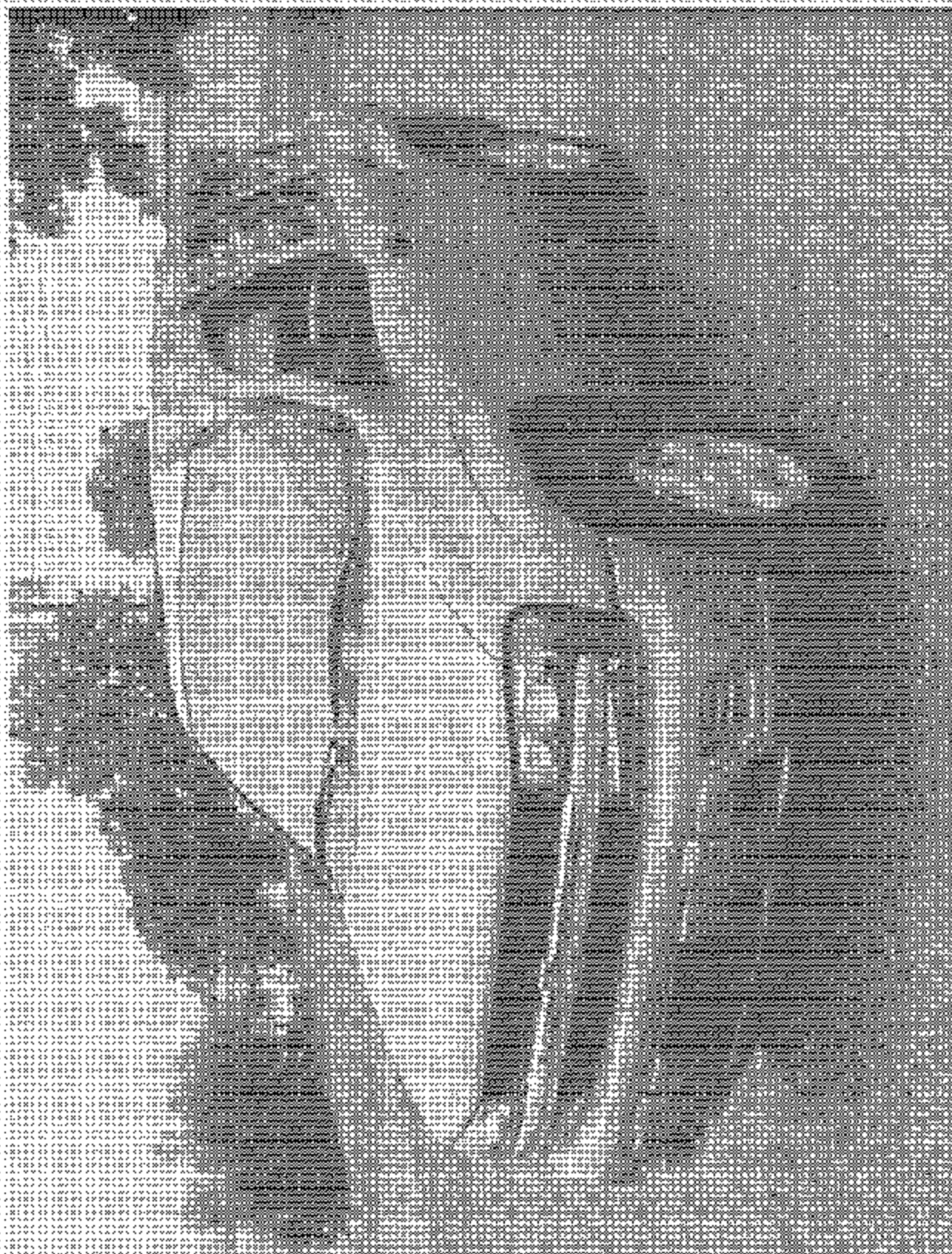


FIGURE D-24  
SIDE VIEW OF LOADING DEVICE PLACED  
AGAINST VEHICLE ROOF AT FULL LOAD

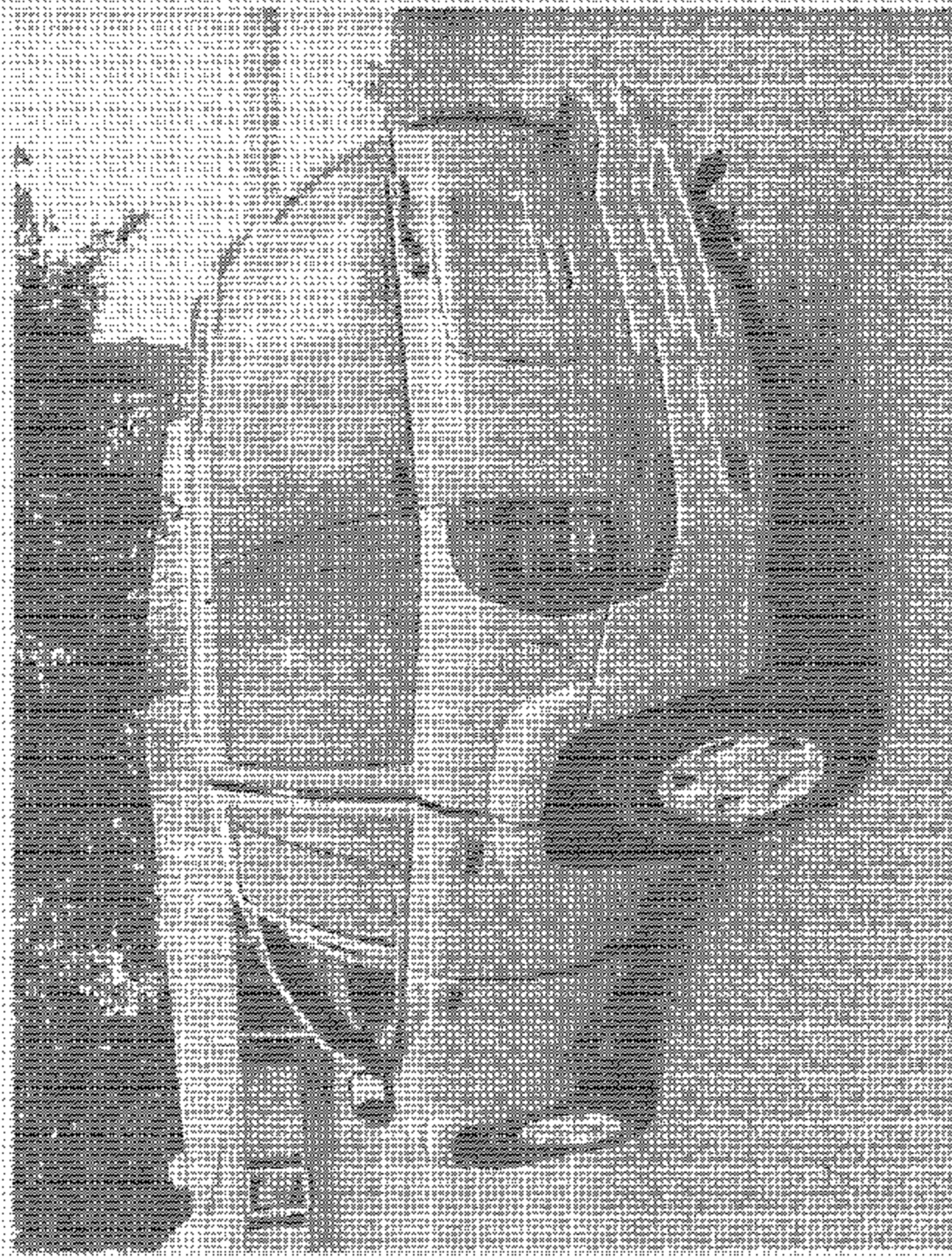
2003 CHEVROLET TRAILBLAZER  
NHTSA NO. D3016  
FMVSS NO. 210





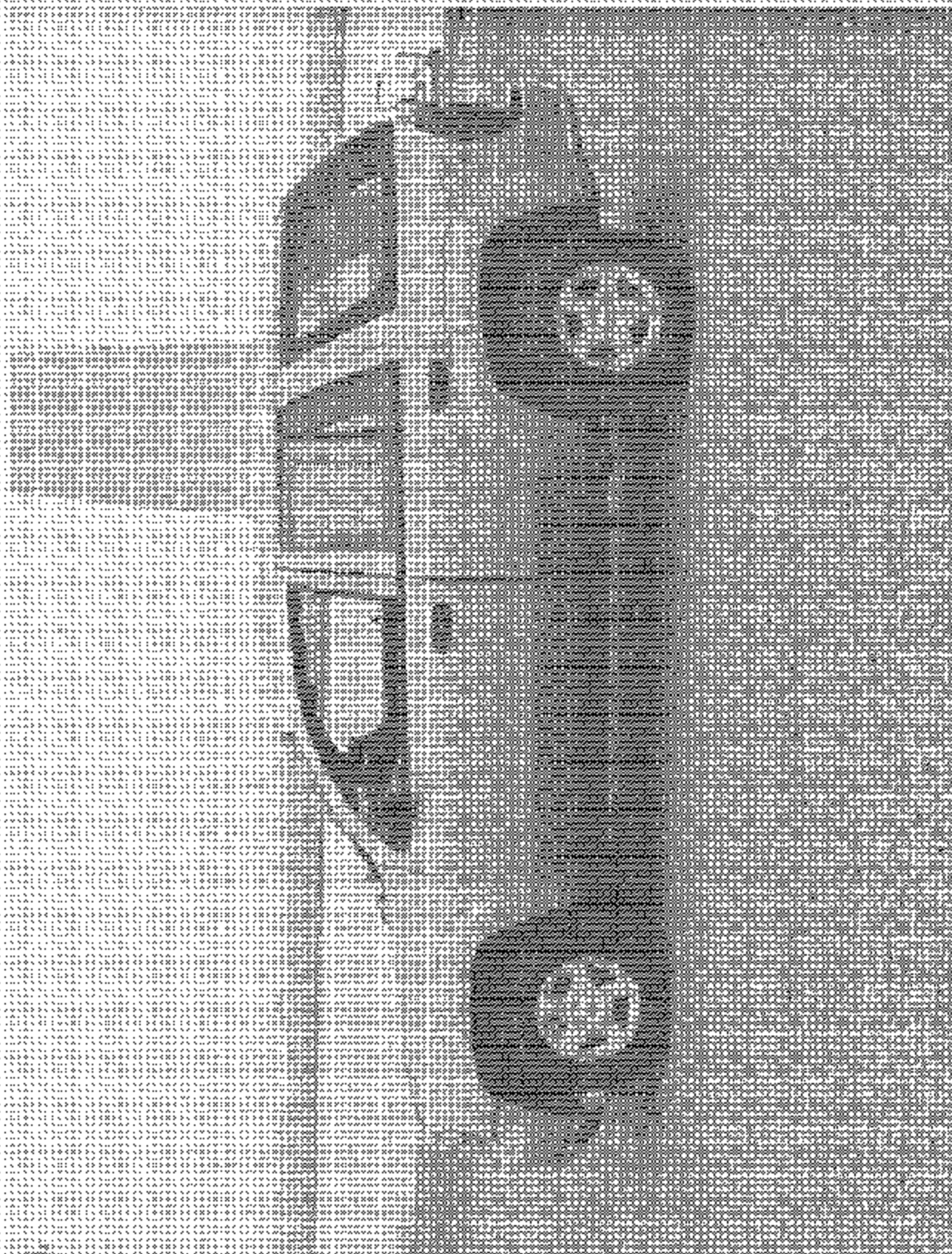
2003 CHEVROLET TRAILBLAZER  
NHTSA NO. D20107  
FMVSS NO. 216

FIGURE 3-26  
3. FORWARD VIEW OF VEHICLE ON TESTED  
SIDE AFTER TESTING



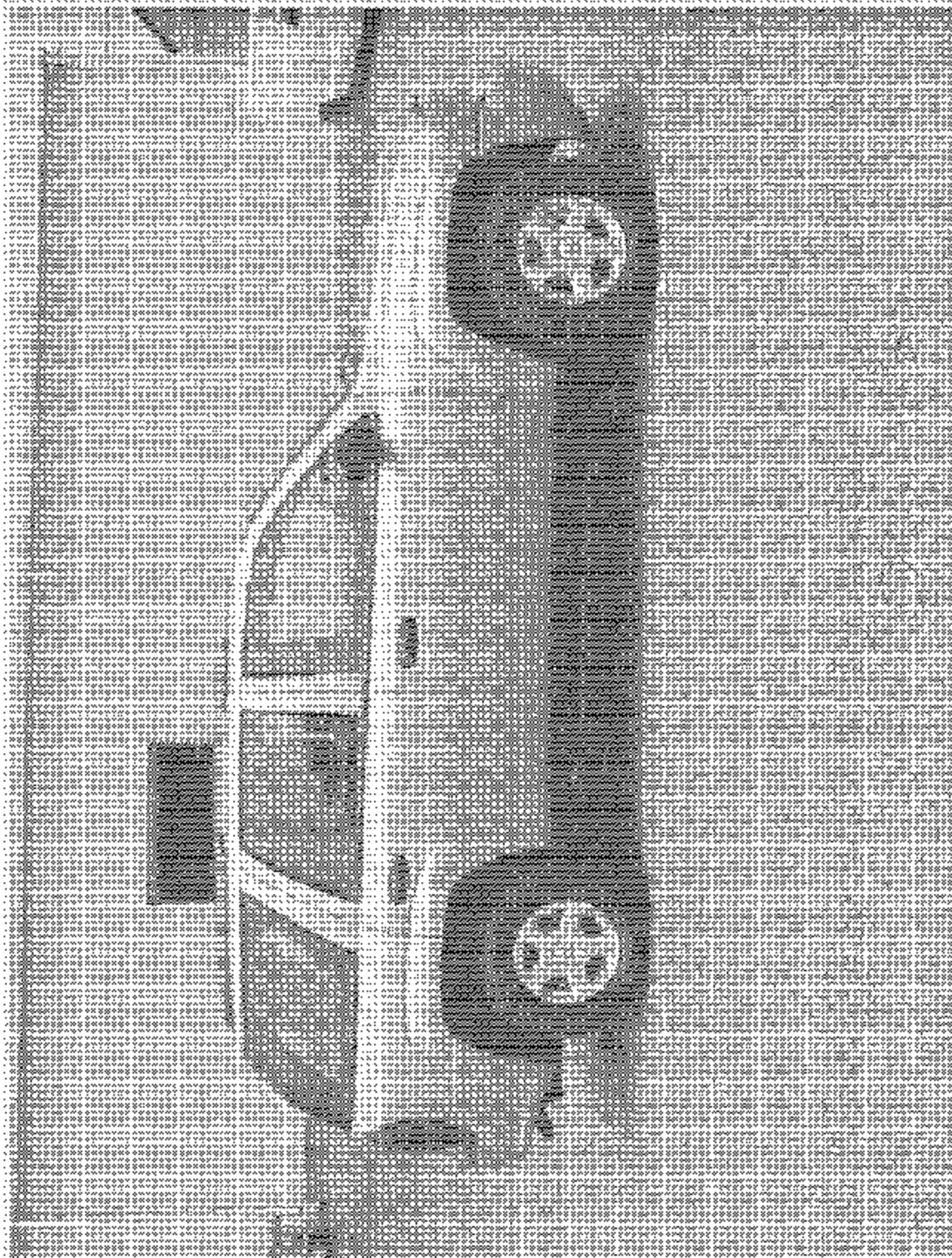
2003 CHEVROLET IMPALA  
NHTSA NO. C30107  
PHVSS NO. 215

FIGURE 6.26  
3/4 REARWARD VIEW OF VEHICLE ON TESTED  
SIDE AFTER TESTING



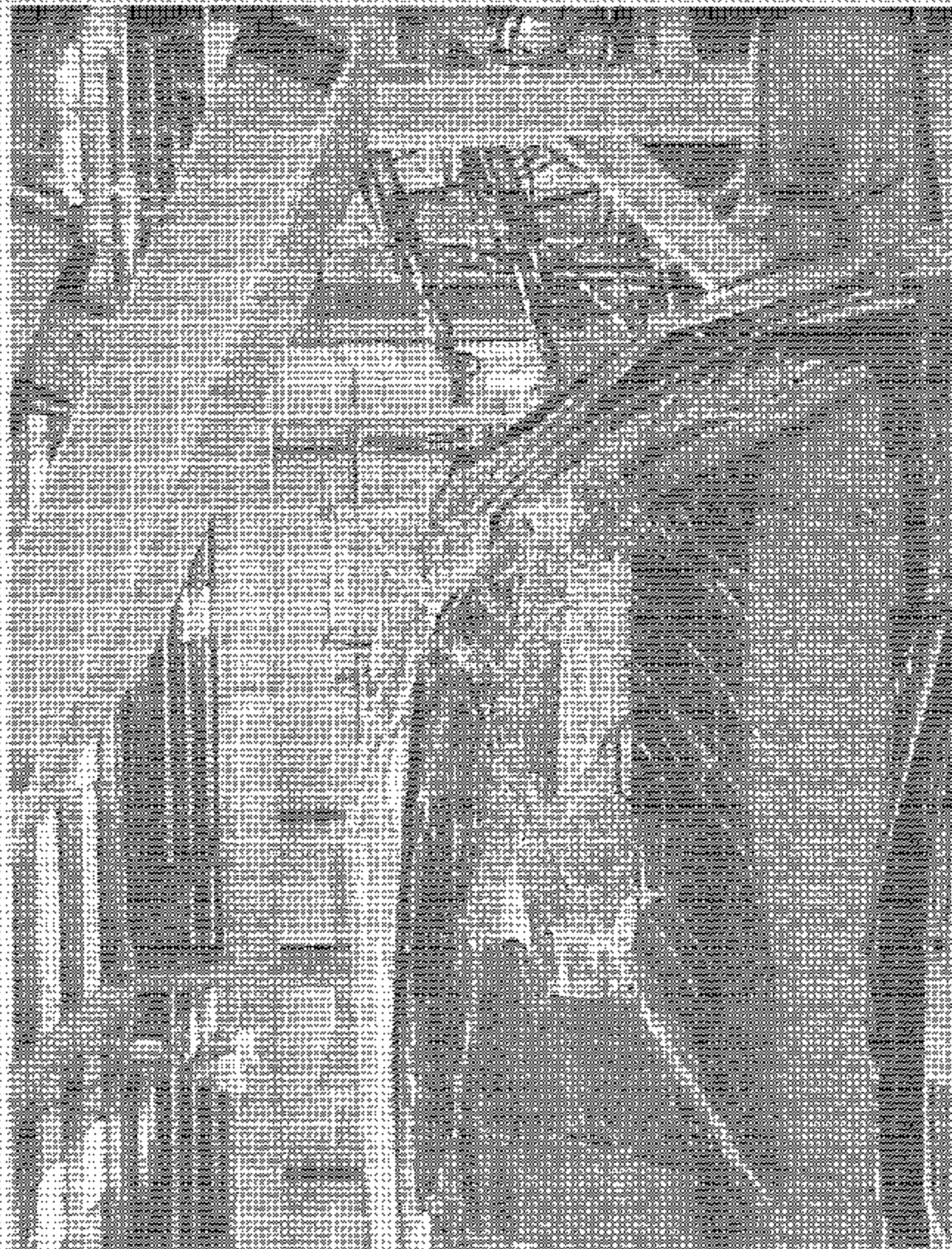
CHEVROLET TRAILBLAZER  
UNIT # NO. C10107  
SERIES NO. 210

FIGURE 3-27  
LEFT SIDE VIEW OF VEHICLE AFTER TESTING



2003 CHEVROLET TRAILBLAZER  
NHTSA NO. D30107  
FMVSS NO. 216

FIGURE 3-28  
RIGHT SIDE VIEW OF VEHICLE AFTER TESTING



2003 CHEVROLET "ROLL-A-RAMP"  
NHTSA NO. C3010  
EARS NO. 210

FIGURE 3-29  
FRONT VIEW OF VEHICLE ROOF AFTER  
REMOVAL OF LOADING DEVICE



FIGURE 5-30  
REAR VIEW OF VEHICLE ROOF AFTER  
REMOVAL OF LOADING DEVICE

3100 O-BURNBLEN PLAIN BLAZER  
NUTSA HD. CLOIR  
FWWES NO. 278

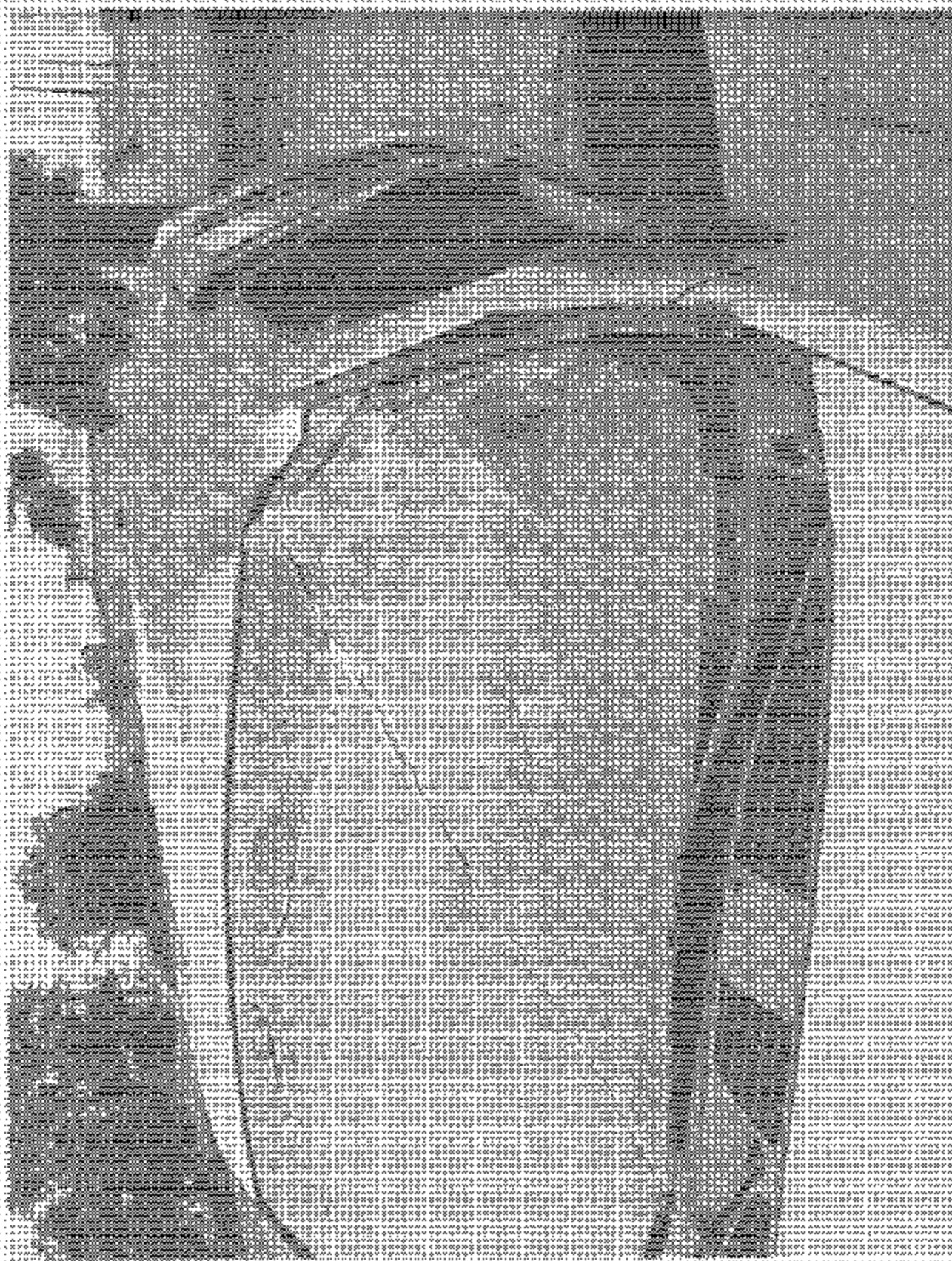


FIGURE D-3  
CLOSE-UP VIEW OF ROOF POST TEST

2000 CHEVROLET TRAILBLAZER  
NHTSA NO. 030197  
FNA'S NO. 236

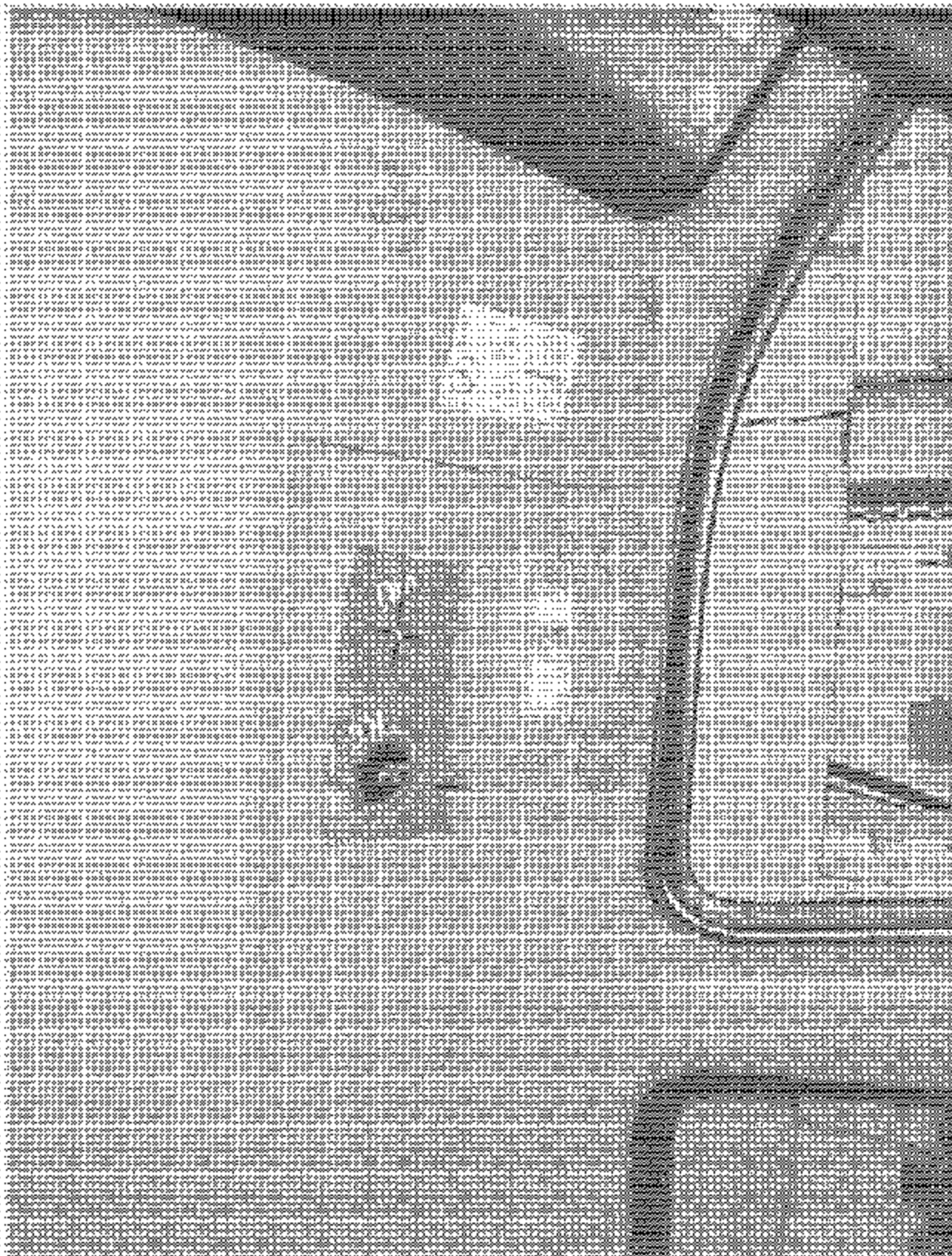


FIGURE 6.52  
INTERIOR VIEW OF ROOF PRE-TEST

2403 CHEVROLET | PALLADIUM  
NITEBA NO. C0107  
RMVSS NO. 215



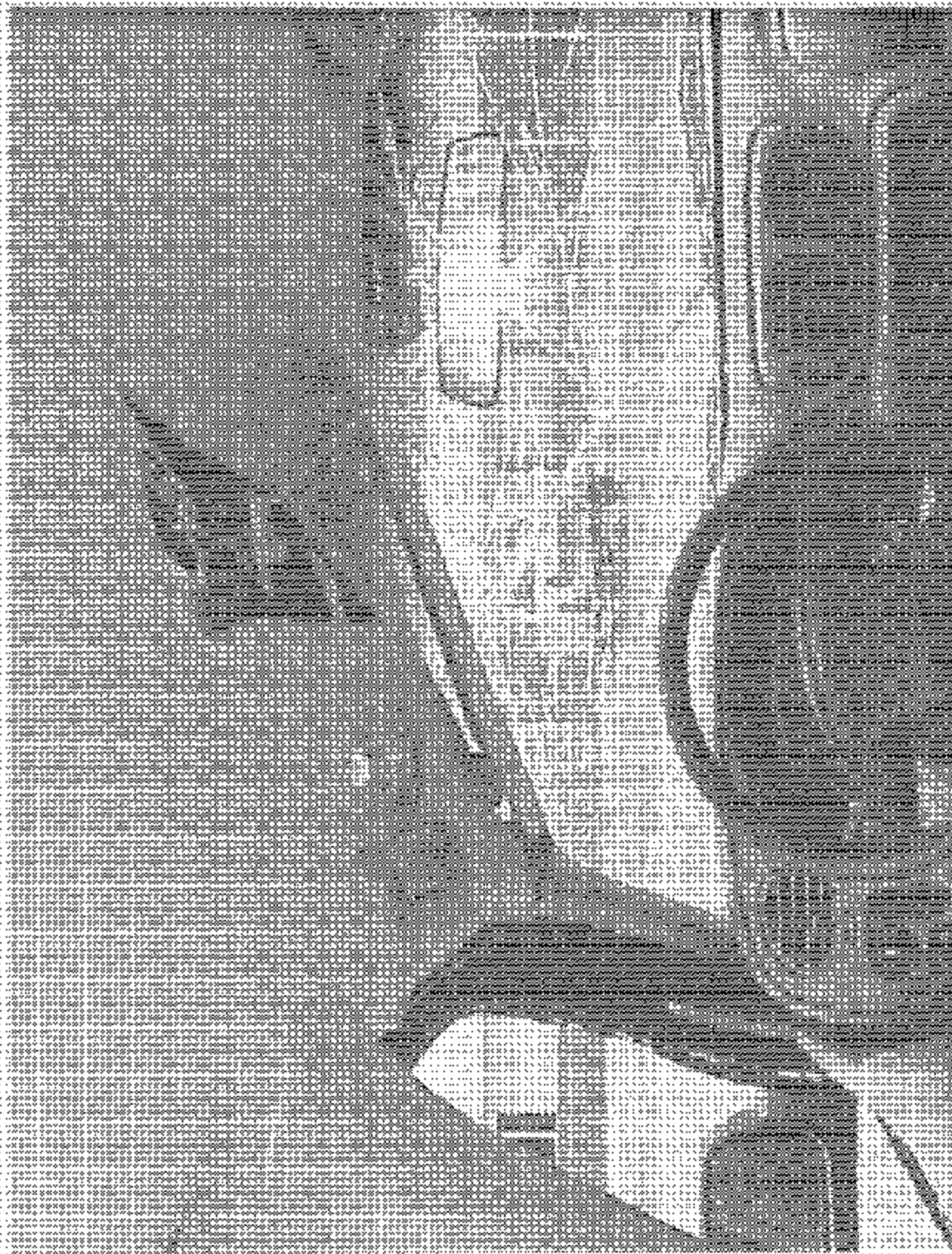
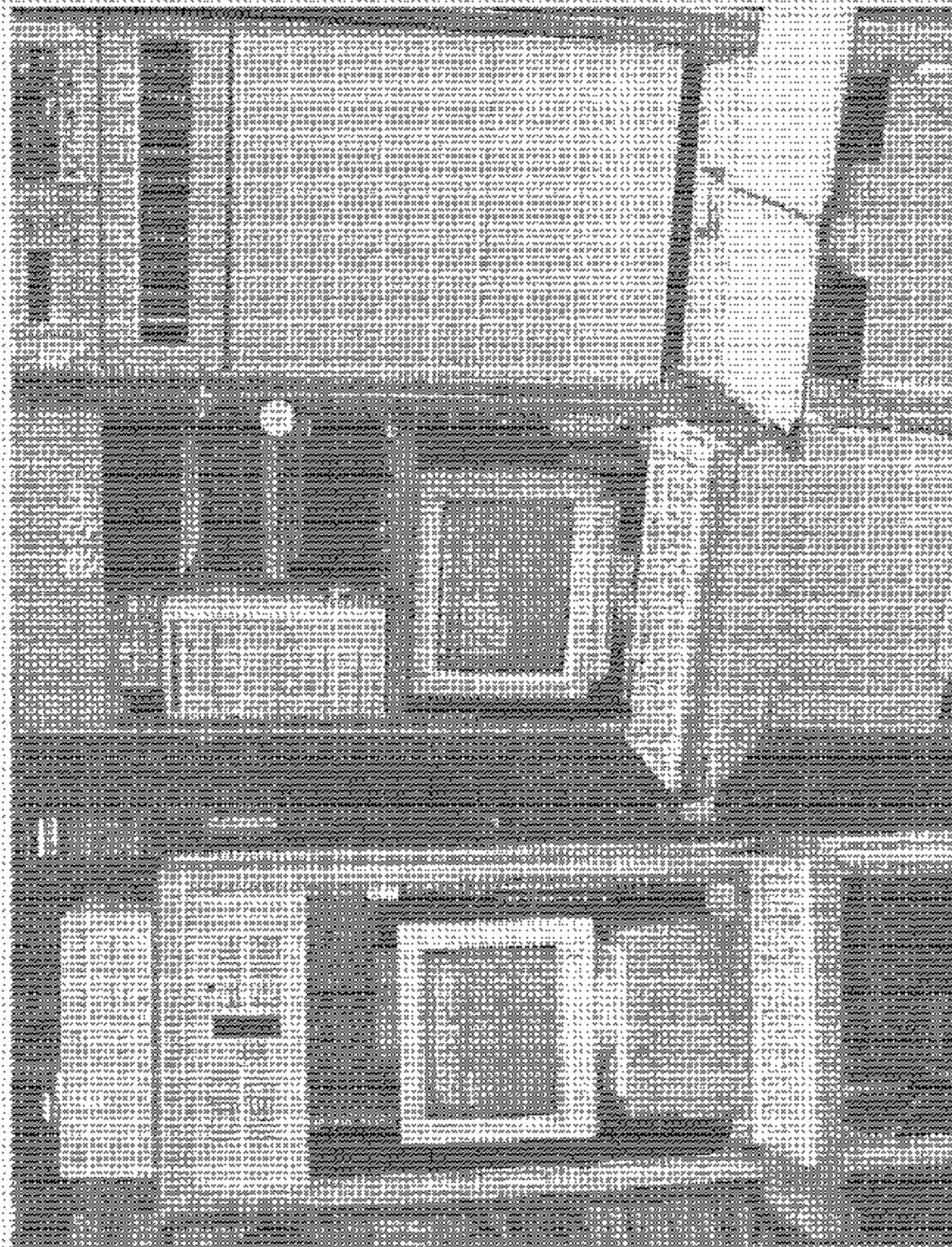


FIGURE 6-33  
INTERIOR VIEW OF ROOF POIST 123

2003 CHEVROLET TRAILBLAZER  
NHTSA NO. C3019  
FMVSS NO. 276



2004 CHROMA-LET TRAN BLAZER  
NIRSA AG C30107  
PART NO 216

FIGURE 5.24  
INSTRUMENTATION SET-UP



Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	

1. *Pharmaceutical Innovation and the Role of the State*  
 2. *The Impact of Patent Law on Drug Development*  
 3. *The Role of Government in Regulating Pharmaceuticals*  
 4. *The Impact of Health Insurance on Drug Access*  
 5. *The Role of the Pharmaceutical Industry in Public Health*  
 6. *The Impact of Globalization on Pharmaceutical Markets*  
 7. *The Role of the Pharmaceutical Industry in Developing Countries*  
 8. *The Impact of Biotechnology on Pharmaceutical Innovation*  
 9. *The Role of the Pharmaceutical Industry in the Future of Healthcare*  
 10. *The Impact of the Pharmaceutical Industry on the Environment*

**Figure 1**

1. *Chlorophyll a* (Chl *a*) is the primary photosynthetic pigment in most plants and algae. It is responsible for capturing light energy and converting it into chemical energy through the process of photosynthesis. Chl *a* is a green pigment and is found in the chloroplasts of plant cells.

2. *Chlorophyll b* (Chl *b*) is an accessory pigment that works in conjunction with Chl *a* to capture light energy. It is a yellow-green pigment and is found in the chloroplasts of plant cells. Chl *b* helps to broaden the range of light wavelengths that can be absorbed by the photosynthetic system.

3. *Carotenoids* are a group of pigments that include carotenes and xanthophylls. They are responsible for capturing light energy and transferring it to Chl *a* for use in photosynthesis. Carotenoids are found in the chloroplasts of plant cells and are responsible for the yellow, orange, and red colors seen in autumn foliage.

4. *Xanthophylls* are a type of carotenoid that are involved in the light-harvesting process. They are responsible for capturing light energy and transferring it to Chl *a*. Xanthophylls are found in the chloroplasts of plant cells and are responsible for the yellow color seen in autumn foliage.

5. *Anthocyanins* are a group of pigments that are responsible for the red, purple, and blue colors seen in many plants. They are found in the vacuoles of plant cells and are responsible for the coloration of many flowers and fruits.

6. *Flavonoids* are a group of pigments that are responsible for the yellow, orange, and red colors seen in many plants. They are found in the vacuoles of plant cells and are responsible for the coloration of many flowers and fruits.

7. *Anthoxanthins* are a group of pigments that are responsible for the white and light yellow colors seen in many plants. They are found in the vacuoles of plant cells and are responsible for the coloration of many flowers and fruits.

8. *Anthocyanins* are a group of pigments that are responsible for the red, purple, and blue colors seen in many plants. They are found in the vacuoles of plant cells and are responsible for the coloration of many flowers and fruits.

9. *Anthocyanins* are a group of pigments that are responsible for the red, purple, and blue colors seen in many plants. They are found in the vacuoles of plant cells and are responsible for the coloration of many flowers and fruits.

10. *Anthocyanins* are a group of pigments that are responsible for the red, purple, and blue colors seen in many plants. They are found in the vacuoles of plant cells and are responsible for the coloration of many flowers and fruits.

1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

**THE**  
**WORLD'S**  
**LARGEST**  
**BOOKSTORE**

**THE**

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[illegible]

2003 CHEVROLET MALIBU 4DR  
MITSUBISHI GALANT  
FATUSE NO 276

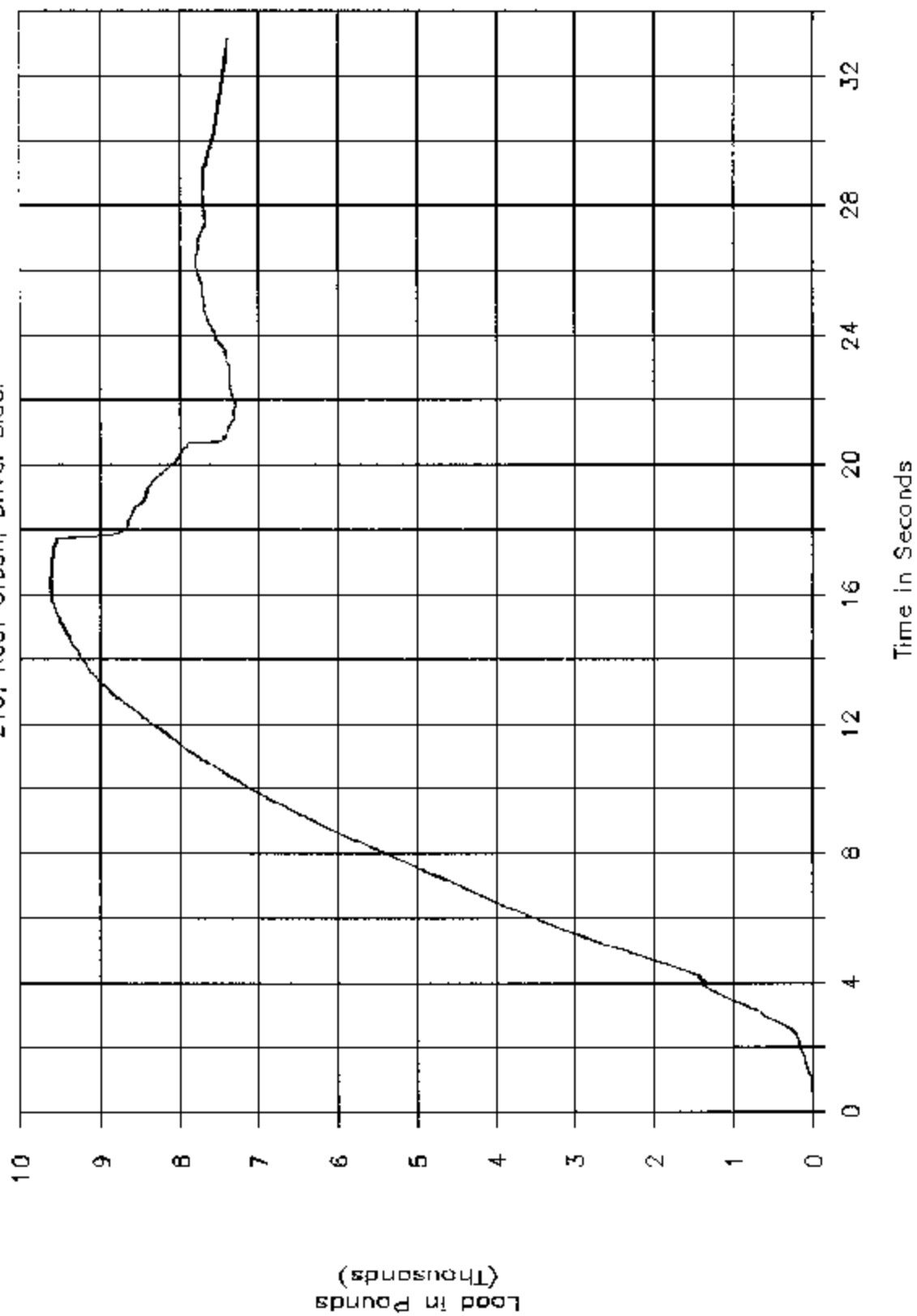
FIGURE 3-35  
CLOSE-UP VIEW OF VEHICLE CERTIFICATION  
AND TYPE INFORMATION LABEL

## SECTION 6

## TEST PLOTS

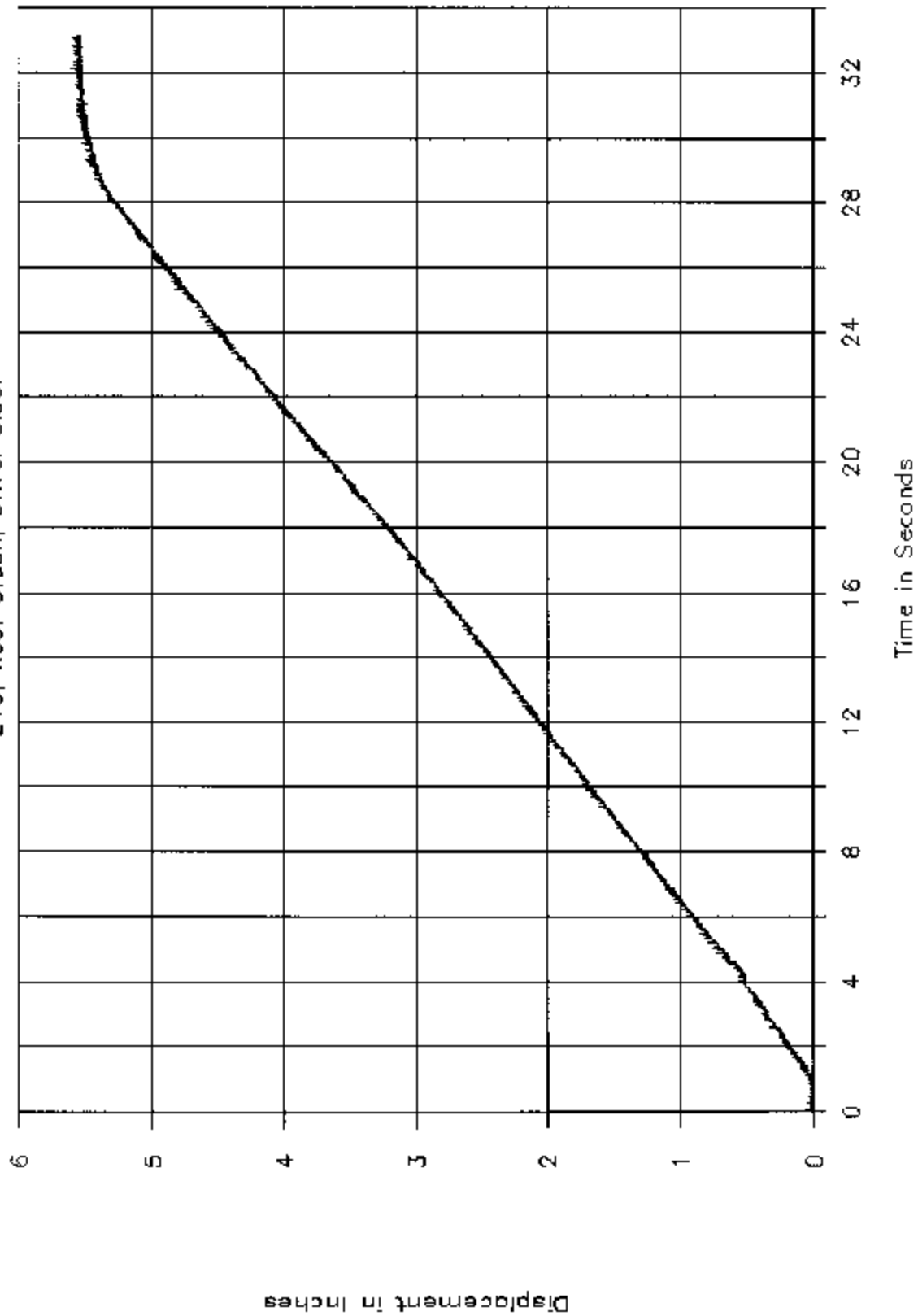
# GTL 5101

216, Roof Crush, Driver Side.



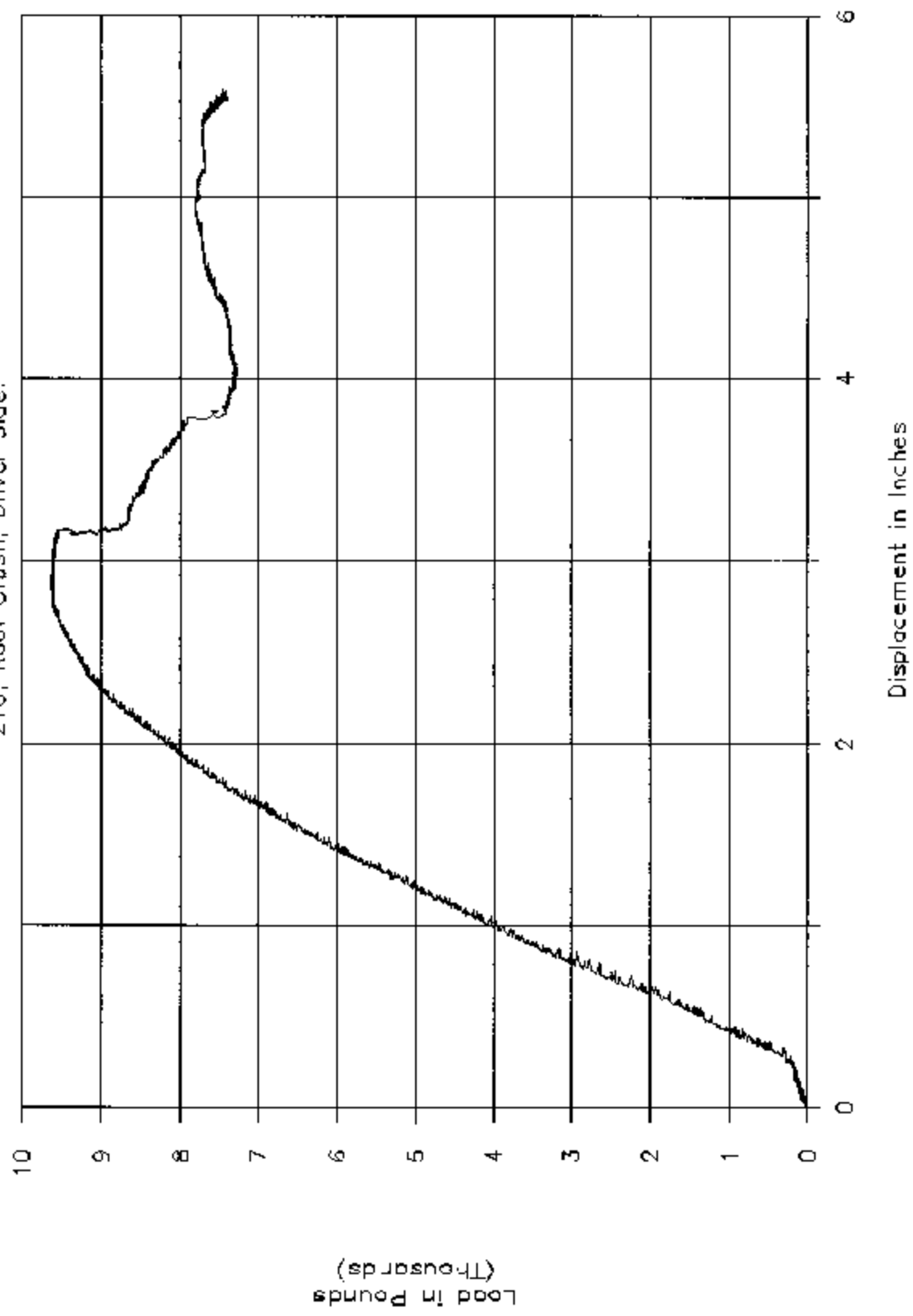
# GTL 5101

216, Roof Crush, Driver Side.



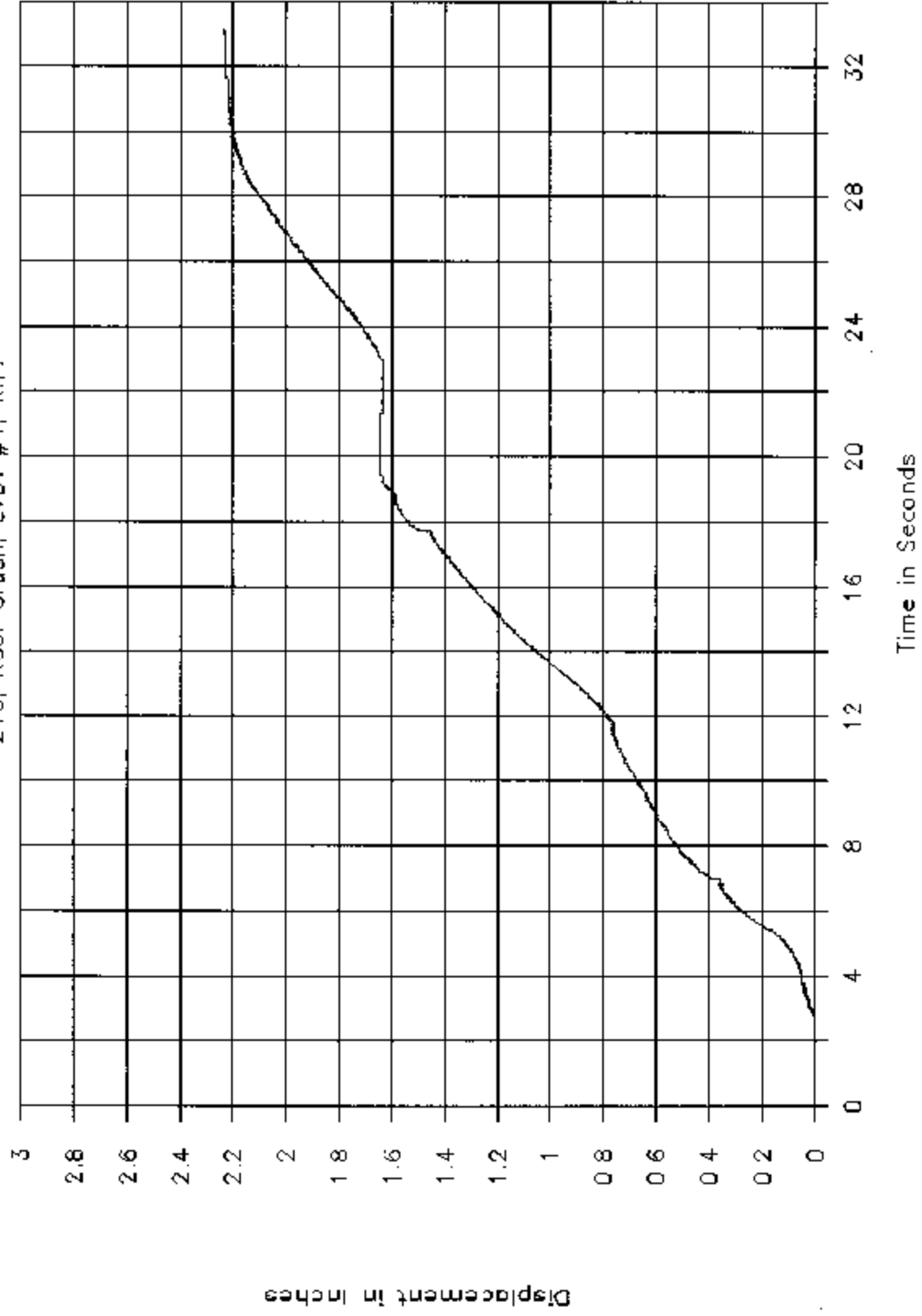
# GTL 5101

216, Roof Crush, Driver Side.



# GTL 5101

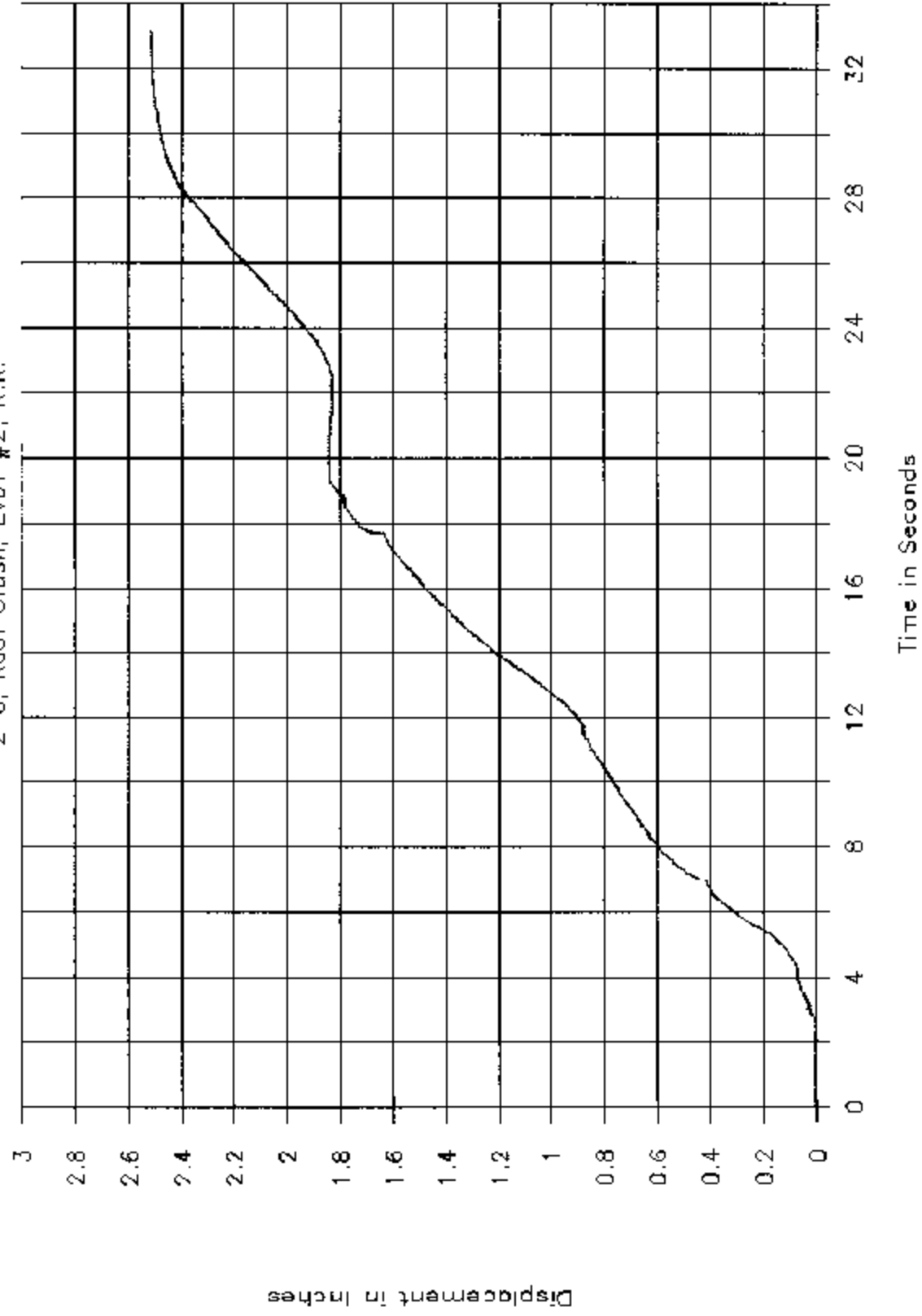
216, Roof Crush, LVDT #1, R.F.





GT\_ 5101

2'6, Roof Crush, LVDT #2, R.R.



# GTL 5101

216, Roof Crush, LVDT #3, L.R.

